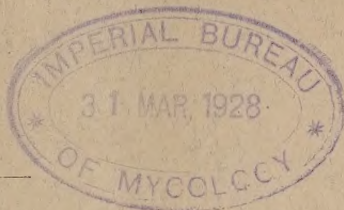


IMPERIAL
DEPARTMENT OF AGRICULTURE
FOR THE WEST INDIES



REPORT
ON THE
AGRICULTURAL DEPARTMENT
DOMINICA.

1926-27.

TRINIDAD.

ISSUED BY THE IMPERIAL COMMISSIONER OF AGRICULTURE.

IMPERIAL COLLEGE OF TROPICAL AGRICULTURE.

1928.

[Price Sixpence.]

PRINTED AT THE BULLETIN OFFICE, ROSEAU, DOMINICA, B.W.I.



REPORTS
ON THE
BOTANIC STATION ECONOMIC
PLOTS, AND AGRICULTURAL
EDUCATION DOMINICA.

Annual Reports on Certain Economic Experiments conducted in connection with the Botanic Station, 1900-2.

Annual Reports on the Botanic Station for the years 1901 and 1902.

Annual Reports on the Botanic Station, Economic Experiments, and Agricultural Education for the years 1902-3 to 1921-22.

Report on "Lime Varieties in Dominica" by F. G. Harcourt, Agricultural Superintendent.

WITH THE COMPLIMENTS OF THE CURATOR

IMPERIAL
DEPARTMENT OF AGRICULTURE
FOR THE WEST INDIES.



REPORT
ON THE
AGRICULTURAL DEPARTMENT
DOMINICA.
1926-27.

TRINIDAD.

ISSUED BY THE IMPERIAL COMMISSIONER OF AGRICULTURE.

IMPERIAL COLLEGE OF TROPICAL AGRICULTURE.

1928.

[Price Sixpence.]

PRINTED AT THE BULLETIN OFFICE, ROSEAU, DOMINICA, B.W.I.

STAFF OF THE AGRICULTURAL DEPARTMENT, DOMINICA.

F. G. HARCOURT, F.R.H.S.....	.....	Agricultural Superintendent and Curator of the Botanic Gardens and the Experiment Station.
J. W. WRIGHT	.....	Assistant Curator.
F. L. SQUIBBS	.....	Second Assistant Curator.
J. C. MACINTYRE, M.B.E.....	.....	Peasants Adviser.
G. A. WINSTON	.....	Clerk.
J. C. BRUNY	.....	Travelling Agricultural Instructor.
A. C. WINSTON	.....	Travelling Agricultural Instructor.
F. J. BAPTISTE	.....	Foreman.
*J. J. McDOWELL	.....	Plant Inspector.
S. J. BAPTISTE	.....	Overseer.

* Temporary appointment.

LETTER OF TRANSMITTAL.

Co. C. A. 454.

Commissioner of Agriculture to the Administrator, Dominica.

TRINIDAD, 6th September, 1927.

SIR,

I have the honour to forward the report on the working of the Department of Agriculture, Dominica, for the year ended March 31, 1927.

2. The usual routine work has been carried out in the Botanic Gardens, Experiment Station and Nurseries. The severe storm of July 22, 1926, caused a considerable amount of damage to ornamental and economic trees.

3. The need for new varieties of limes immune and resistant to Withertip disease has received attention, and Mr. Harcourt's address to the Agricultural Society on the work that has been done in this connection which appears as Appendix I of this report is of interest.

4. The experience at the Experiment Station during the July gale and the severe attack of Withertip strongly indicates the value of limes budded on sour orange. Although 150 lime trees were blown down in the gale, not one of the budded limes were blown over, and although subjected to the most severe attacks of Withertip in the Station, they gave the highest yields.

5. The distribution of economic plants, other than limes, has been carried on during the year, and the numbers of coffee, coconut, cacao and nutmeg plants sent out would seem to indicate that interest is being well maintained in the attempt to find crops to replace limes, where these have suffered badly from Withertip.

6. Withertip persists in its severe attack in the wet districts, and in addition the Red root disease has attacked the limes in the drier districts and has caused a considerable amount of damage. Since the report was written the island has been visited by Dr. Briton-Jones, who carefully studied the outbreak of the Root disease, and has prepared an interesting and valuable report on the subject.

7. The account of the working on the Agricultural Loan Board which is administering a portion of the funds of the grant in aid shows that careful attention is being given to this important matter and in Appendix II an account is given of the working of the Peasants' Information Bureau and Produce Exchange. These organisations would appear to be working well with a prospect of producing good results in the agriculture of Dominica.

8. The failure of the Swift Banana Company to carry on its work has been a disappointment to the people of Dominica. There seemed at one time to be a good prospect of developing a banana growing industry in Dominica.

9. The Lime crop for 1926 was a very small one. This appears to have been due to the effects of Withertip and the severe storm of July 22, which caused the loss of a large part of the young crop on the trees. The unusually high prices which prevailed during a part of the year compensated to a considerable extent for the short crop.

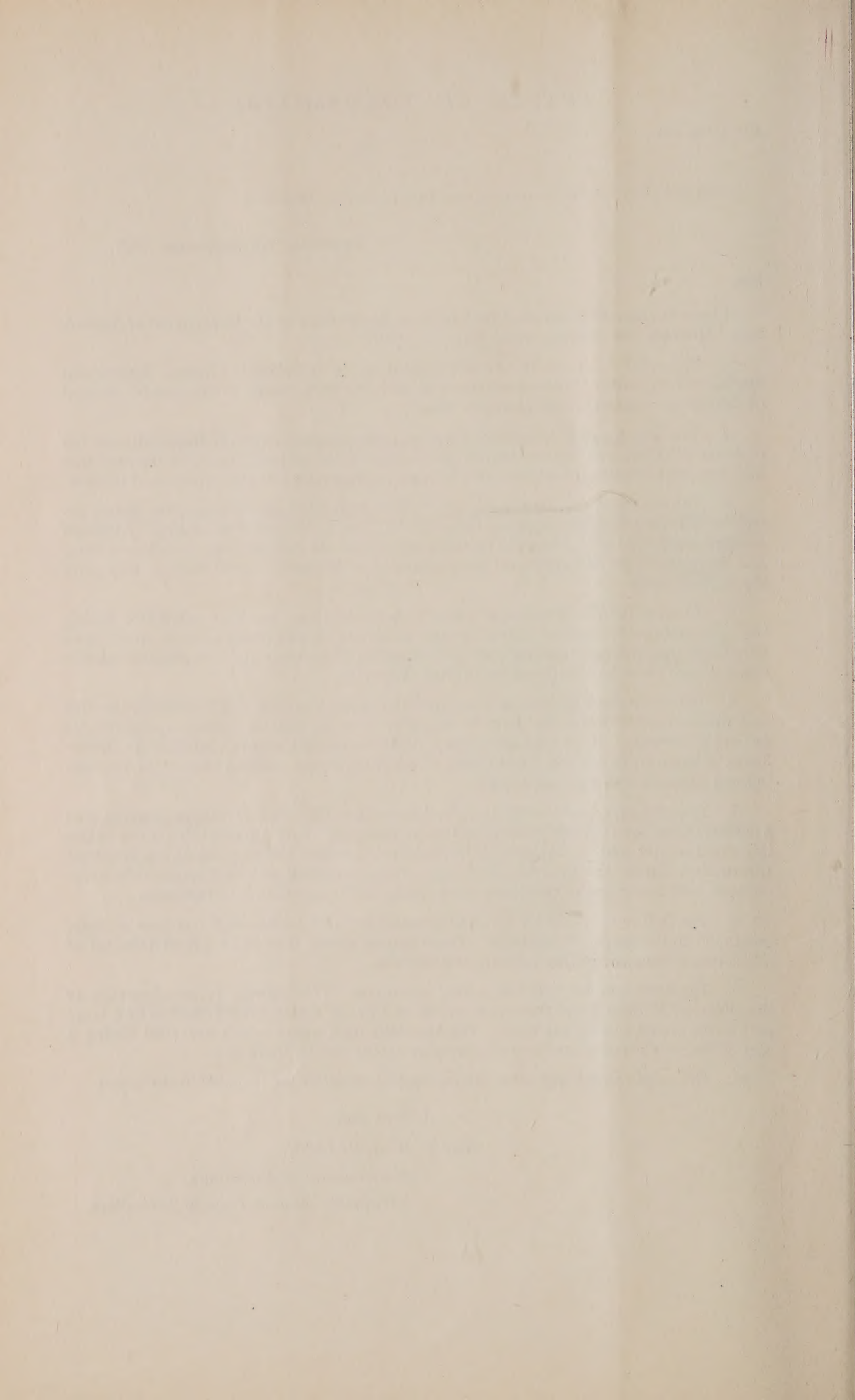
10. The usual rainfall and other meteorological statistics are included in the report.

I have, etc.,

(Sgd.) H. A. BALLOU,

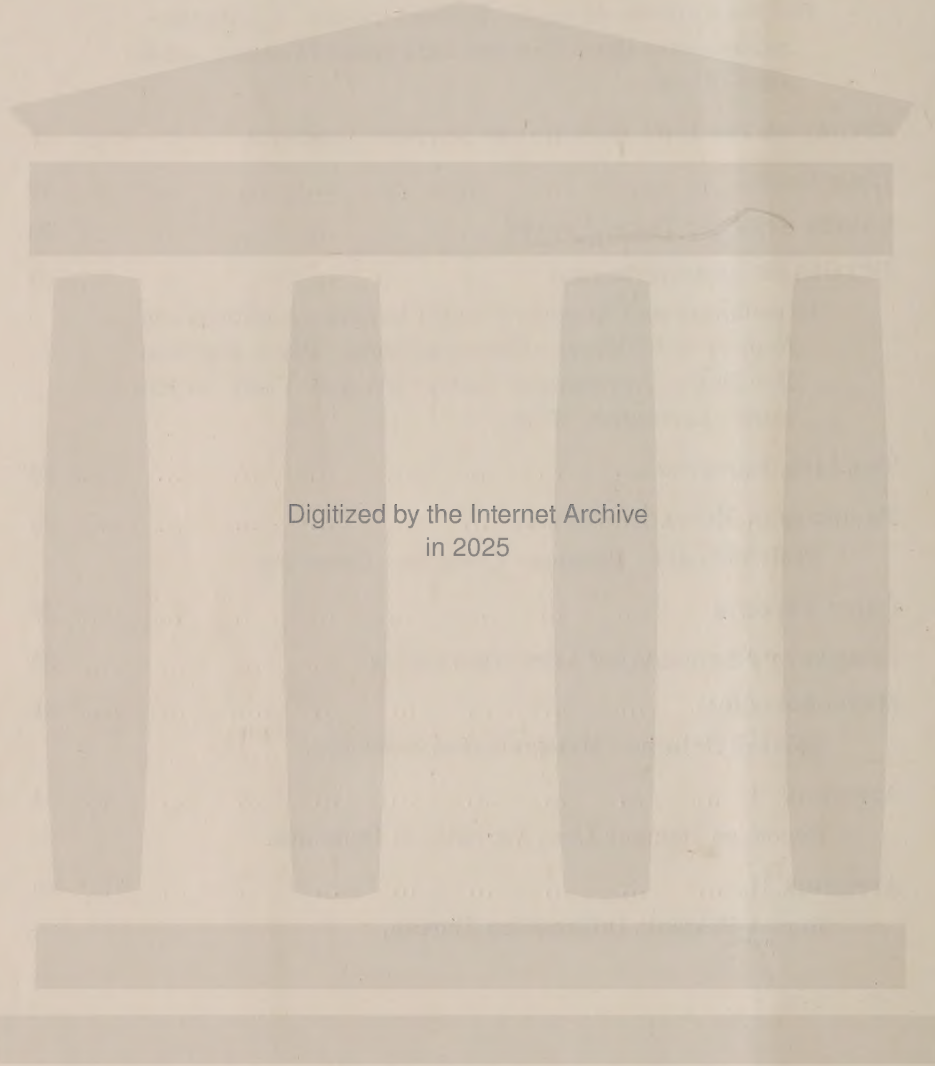
Commissioner of Agriculture,

Imperial College of Tropical Agriculture.



CONTENTS.

	PAGE.
WORK IN THE BOTANIC GARDENS AND OBSERVATIONS ON PLANTS ...	1
WORK IN THE NURSERIES AND DISTRIBUTION OF PLANTS ...	2
PLANT IMPORTATIONS ...	4
WORK CONNECTED WITH INSECT PESTS AND FUNGUS DISEASES ...	5
Red Root disease of limes—Panama disease of Bananas— Sphæronema Black Spot and Bark Root of Cocoa—Coffee Leaf Miner.	
REPORT ON THE LIME EXPERIMENT STATION, DOMINICA ...	7
LOAN BOARD ...	19
GOMIER STEWART TRUST ESTATE ...	20
DETAILS OF ADMINISTRATION ...	21
Expenditure and Receipts—Staff Changes—Additions and Repairs to Buildings—Correspondence—Plant and Seed Exchange—Agricultural Instruction and Visits to Es- tates—Laboratory Work.	
THE LIME INDUSTRY ...	23
PROGRESS IN MINOR INDUSTRIES ...	25
Fruit Industry—Bananas—Coconuts—Cocoa etc.	
CHIEF EXPORTS ...	29
SUMMARY OF LEGISLATION AFFECTING CROPS ...	30
METEOROLOGICAL ...	31
Rainfall Returns—Meteorological Summary.	
APPENDIX I. ...	34
Report on Immune Lime Varieties in Dominica.	
APPENDIX II. ...	40
Report Peasants Information Bureau.	



Digitized by the Internet Archive
in 2025

REPORT ON THE AGRICULTURAL DEPARTMENT, DOMINICA.

FOR THE YEAR ENDED MARCH 31, 1927.

WORK IN THE GARDENS AND OBSERVATIONS ON PLANTS.

THE routine work in the Botanic Gardens has been maintained at its usual high level, but financial stringency, together with the new line of work undertaken by the Department, particularly nursery work, has precluded necessary work to maintain the beauty of the Gardens.

In bringing together a botanical collection in the tropics it is sometimes necessary to introduce trees that eventually develop to a size out of all proportion to their surroundings, and their removal becomes a necessity. Although adequate spacing can be admirably shewn in the case of trees in the Botanical Gardens, there are examples as for instance the *Ficus elastica* and *Ficus altissima* by the Curator's Office where their removal would not only be beneficial to surrounding subjects, but improve the large area they now cover by rendering it available for the planting of smaller growing specimens. This, however, is a big operation, and is mentioned to illustrate the type of work that must of necessity be left over for the time being.

A bed of *Bougainvillea spectabilis*, which had become a shapeless mass and dying through old age, was removed from the lawn situated between the Mango Plot and the main drive, and replaced by plants of *Erythrina cristagalli* raised from seed introduced during the year.

The border of shrubs to the east of the main lawn was reduced in width and groups of *Clerodendron fallax* planted.

Fifteen garden seats of a good serviceable type have been added to the Gardens and are much appreciated by visitors. Other seats in the Gardens, on the Morne, Jack's Walk and the Upper Garden Walk have been reconditioned.

The cricket pitch situated on the Main Lawn, previously kept in order by the Cricket Council, was taken over by the Department and put in good condition for the Leeward Islands Inter-Presidential Cricket Tournament matches which were played in June. The pitch in future will be controlled and kept in condition by the Department.

In the Economic Section of the Gardens a plot of Spineless Limes, consisting of 20 trees, rendered unproductive by Withertip disease, were removed and the land utilised for nursery work.

A severe storm passed over Dominica on the night of the 22nd July, 1926, and caused considerable damage to the Botanical Gardens, Nurseries and Experimental Stations.

The damage to the Experiment Station and Nurseries will be mentioned when dealing with these particular sections.

In the Ornamental Section of the Gardens five trees were completely destroyed and thirty-seven others suffered more or less serious damage. Some of these, owing to being partly blown over and pulled back into position, have their anchorage weakened for resistance to further gales, others by the loss of large limbs have lost their symmetrical shape. The varying direction of a hurricane wind was demonstrated by the different angles at which trees in a comparatively small radius were hit.

The five trees destroyed were *Cedrela Toona* (the one specimen in the Gardens) *Eucalyptus corymbosa*, *Plumieria alba*, *Piscidia Erythrina* and a large specimen of *Bombax malabaricum*.

Notable damage was caused to the fine specimen tree of *Ficus Benjamina* situated in the centre of the Gardens. The diameter of the circular spread of this tree is restricted to 100 feet, and the removal of large limbs by the storm caused a break in its circle. The tallest tree in the Gardens, *Sterculia alata*, over 110 feet high, lost one of its three main branches; this tree lost its leader in a storm a few years ago.

The avenues of *Raphia vinifera* and *Oreodoxa oleracea* sustained heavy, but not permanent, damage. Other trees and shrubs damaged included *Juniperus pachyphloea*, *Eucalyptus crebra*, *Pachira aquatica*, *Ficus elastica*, *Terminalia Buceras* and *T. belerica*, *Sideroxylon floribundum*, *Carapa guianensis*, *Piptadenia peregrina*, *Jacaranda mimosæfolia*, *Tabernaemontana usambarensis*, *Tabebuia pentaphylla*, *Cassia grandis*, *Sandoricum indicum*, *Ravenala Madagascariensis*, *Laportea longifolia*, *Dialium guineense*, *Gmelina arborea*, *Hæmatoxylon campechianum*, *Cestrum diurnum* and *Dracæna fragrans*.

Slight damage was done to the wall adjoining Bath Road by the fall of two *Eucalyptus* trees.

It is interesting to record the first flowering of a six year old tree of *Taraktogenos Kurzii*; it however failed to set seed. At the time of writing this report it is again carrying a quantity of flower buds on its topmost branches.

This tree has now reached a height of 18 feet and was raised from seed received in December, 1920, from the Botanic Gardens in Calcutta. From this consignment of seeds two forms of *Taraktogenos Kurzii* are to be observed, one of a compact growth with dark green leaves of somewhat heavy texture; the other, whose flowering is now recorded, of an open and more branching habit of growth, possessing light green leaves, and having internodes twice the length of the former. In Bulletin No. 1057 of the United States Department of Agriculture "The Chaulmoogra Tree and some related species" by Dr. J. F. Rock, states that he noted differences in the Assam *T. Kurzii* as compared with the Burma *T. Kurzii*; that the Assam form has dark green leaves and compact habit, whilst the Burma agrees in appearance with the one that has just flowered here. Photographs of the two forms are shown in Kew Bulletin No. 1 of 1926.

All the plants of *Oncoba echinata* flowered and fruited prolifically during the year.

Another interesting tree to flower for the first time here was *Poutaria survis*, a native of Uruguay; no fruit were set. There are two specimens of this tree in the Gardens which were raised from seed received from Kew in 1915. The tree is reputed to bear a pear shaped fruit having an extremely agreeable taste and possessing a finer aroma than a ripe pineapple.

Mention must be made of the flowering of two more Talipot Palms, *Corypha umbraculifera*. These palms bearing their enormous terminal panicles of flowers and a large setting of fruit, attracted considerable attention from visitors. This makes a total of seven palms of this species that have flowered during the last four years in the Gardens.

Attention must be drawn to the happy condition and freeness of flowering of the young trees of *Amherstia nobilis* from Burma. Some difficulty was experienced in establishing these trees, but the sheltered and shady place where they are now located seems eminently suited to their requirements. Of the three specimens growing two have attained a height of over 30 feet.

WORK IN THE NURSERIES AND DISTRIBUTION OF PLANTS.

In the Department's Report for last year, note was made of the awakening of interest in new lines of work by planters, and the increased demand for planting material of all kinds. It is satisfactory to be able to record that in spite of a greatly increased output of plants, particularly budded and grafted ones, the demand is healthily maintained.

Subsequent to an address given by the Agricultural Superintendent, on "Lime varieties under trial by the Department" large orders were placed for varieties favourably spoken of and all available land is now being planted with sour orange and other citrus stocks for budding purposes.

It is necessary to mention that most of the lime varieties are proving difficult to propagate by budding on the Sour Orange Stock, consequently stocks of Pomelo, Rough Lemon and *Citrus hystrix* are being tried to ascertain compatibility etc.

The demand for and issue of seedlings of the West Indian Lime has recommenced in earnest for planting in the dry coastal areas, where this lime may still be economically grown in spite of Withertip disease.

PLANT DISTRIBUTION.

Another hopeful feature is the notable increase in the distribution of young fruit trees, such as Washington Navel Orange, Grape Fruit, and Grafted Mangoes. Although the demand at present greatly exceeds the supply, it is hoped that by various nursery extensions the Department will soon be in a position to cope with this situation.

Some time, however, must elapse before the majority of these orders can be filled, especially for budded plants. This position would be alleviated to a large extent, if as before urged, the larger planters would establish nurseries of their own, budwood and instructions in budding being always obtainable from the Department. It is only fair to mention that one or two progressive estates have established small nurseries and have made a profit by selling their surplus stocks.

There is a good opportunity for some one with enterprise and the necessary training to commence a nursery business in Dominica. The only competitor, if such may be termed, would be the Agricultural Department, which would take a paternal interest in it providing such business was rightly conducted, and gracefully retire from the commercial side of this work, once it was assured of the Island's requirements being supplied at reasonable rates. A Florist and Seedman's business could be developed as a profitable side line.

STORM DAMAGE TO NURSERIES.

The whole shelter protecting the pot plant nursery collapsed during the severe storm of the 22nd July, thereby destroying hundreds of young economic plants. These plants were especially propagated to meet the demand of this Department, by the peasant proprietors, to whom the Department, on recommendation, distributed them free of charge, as an encouragement to extend their cultivations. Plants destroyed included Coconuts, Cocoa, Nutmegs, Oranges, Mangoes etc.

The subsidiary nurseries of the Department, however, did not sustain any damage.

PLANT DISTRIBUTION.

The number of plants sent out during the year is as follows :—

Limes	.....	2,471
Budded Washington Navel Orange	.....	806
„ Grape Fruit	.....	646
„ Portugal Orange	.....	26
„ Tangerine	.....	47
Sour Citrus	.....	1,541
Grafted Mangoes	.....	139
Coconuts	.....	9,169
Coffee	.....	9,102
Cocoa	.....	1,027
Nutmegs	.....	1,600
Papaw	.....	950
Mangosteen	.....	351
Vanilla	.....	100
Anatto	.....	400
Tobacco	.....	6,100
Camphor	.....	12
Eucalyptus	.....	18
Para Rubber	.....	156
Miscellaneous	.....	704
Total		<u>35,365</u>

This total is the highest obtained for several years, as will be noted from the following table :—

Year.	Number of Plants.
1922-23	10,038
1923-24	8,437
1924-25	10,252
1925-26	14,068
1926-27	35,365

PLANT IMPORTATIONS.

The following supply of miscellaneous seeds, seedlings and cuttings were also distributed.

Vegetable Seeds	....	....	....	1,140 packets.
Gliricidia Cuttings	....	....	....	1,000
Guatemala Grass Cuttings	....	....	....	200
Lemon Grass Cuttings	....	....	....	1,895
Elephant Grass Cuttings	....	....	....	3,000
Black Petter Cuttings	....	....	....	225
Clove Cuttings	....	....	....	14
Sour Orange Stocks	....	....	....	32 8 7
Horse Beans	....	....	....	72 lbs.
Tobacco	....	....	....	1½ „

The following lime varieties were distributed during the year :—

Tahiti	....	....	....	60
Sour Lime	....	....	....	3
Bearss Seedless	....	....	....	117
Woglum Lemon	....	....	....	21
Woglum Lime	....	....	....	46
Eustis Limequat	....	....	....	1
Rangpur	....	....	....	170
Citrus aurantifolia	....	....	....	366
Kusaie	....	....	....	719
Everglade Lime	....	....	....	30
Citrus Hystrix	....	....	....	3
Rose's variety of Lime	....	....	....	5
Total				1,541

PLANT IMPORTATIONS.

One of the interesting plant introductions made during the year was a Wardian case of plants, chiefly decorative, which arrived from the Royal Botanic Gardens, Kew, under the the care of the newly appointed Assistant Curator, Mr. F. L. Squibbs. The plants received are :—*Anthurium Bakeri*, *Entada abyssinica*, *Oxalis bupleurifolia*, *Oxalis dispar*, *Allamanda Schottii* var *Hendersoni*, *Oxalis Ortgesii*, *Crossandra undulæfolia*, *Aphalandra aurantiaca*, *Aphalandro nitens*, *Dombeya Wallichii*, *Clerodendron ugandense*, *Strobilanthus isophyllus*, *Picralima Klaineana*, *Whitfieldia laterita*, *Trevesia Micholitzii*, *Pentas carnea*, *Panax Fruiticosum* var *Victoriæ*, *Brunfelsia macrantha*, *Entandophragma utile*, *Streptocarpus Holstii*, *Lophira procera*, *Columnea vedvarensis*, *Pentas coccinea*, *Jasminum Rex*, *Chlorophora excelsa*, *Abutilon Milleri*, *Ardissia crenulata*, *Scutellariæ violacea*.

Twenty-eight of the thirty-one plants despatched, arrived in good condition. They are being grown on for planting out and will prove useful additions to these Gardens.

Seeds of *Hydnocarpus wightiana* were received from the Commissioner of Agriculture, Calcutta. These germinated well and are now almost ready for planting out.

Clerodendron fallax, whose popularity in England as a hot house flowering plant is well known, has been tried in Dominica and has proved very successful. It may be noted that its near species *C. fragrans* is abundant in Dominica.

A distinctive Pigeon Pea, (*Cajanus indicus* var *Early Asha*.) was received from the Imperial Department of Agriculture, Trinidad. It has already shown a marked tendency to fruit early.

The useful vegetables received from Agricultural Department, Antigua, were the Jerusalem Artichoke, (*Helianthus tuberosus*.) and the Bonavist Bean, (*Dolichos Lablab* var *Vilmorin's Stringless*.)

Varieties of Tobacco seed for trial were received from the Director, Royal Botanic Gardens, Kew.

Bauhinia triandra, received from Florida, brings the number of *Bauhinia* species here to seven. Efforts will be made to obtain plants of what is understood to be the best of the genus, *B. Blakiana*, from Hong Kong.

INSECT AND FUNGUS PESTS.

Seeds of the Everglade lime, reported to be resistant to Withertip disease, were received from the Imperial Department of Agriculture, Trinidad, and a number of plants have been raised.

Other seeds received for trial from the Federal Department of Agriculture, Antigua, were *Corchorus olitorius*, *Corchorus capsularis*, *Phytolacca divica*, *Solanum auriculatum* and *Solanum grandiflorum*.

WORK CONNECTED WITH INSECT AND FUNGUS PESTS AND THEIR CONTROL.

ROOT DISEASES.

Report has to be made of a widespread outbreak of Red Root Disease of Limes caused by an undetermined species of the fungus *Sphærostilbe*. Difficulties of control are due to the sporadic incidence of the disease which appeared almost simultaneously over a wide area, and under extremely varying environmental and atmospheric conditions. The first outbreak was reported in December and within three months the disease had spread to an alarming extent and even the best cultivated estates showed that the prospective in which the disease was previously viewed needed revision, and that other measures would have to be taken to check its mysterious spread.

Specimens of diseased roots obtained from the place where and at the time when the disease was first reported, were at once sent to the Mycologist of the Imperial Department of Agriculture, who in reply submitted the following report :-

"The disease is popularly known as "Red Root Disease" and is caused by an undetermined species of the fungus genus *Sphærostilbe*. The disease is most prevalent in new clearings, particularly if the soil is undrained. There are two sources of infections to limes, (I) from logs or roots of stumps (II) from debris carried down by floods. The latter seems to be the case on Morne Guay Estate. The disease spreads from tree to tree along the roots and possibly through the soil so that it is obvious that the uninfected have to be protected and the infected effectively dealt with. The protection of healthy trees or, if preferable on account of the extent of the distribution of the disease, the isolation of affected trees, is done by trenching to a depth of 18 inches or so and these connected up with an efficient system of drainage. The affected tree should be dug up and burned on the spot. The trunks above the infected wood can be cut off and transported for use elsewhere. It is, however, very important to destroy the fungus in the infected roots by burning. No debris, infected or uninfected, should be left on the ground. After cleaning up the ground a heavy application of lime should be given to the treated area. Quicklime if procurable is preferable, but slaked lime can be used. As advised by Mr. Harcourt, good drainage is essential, and if accomplished the disease will generally disappear without any other measures being taken. I am of the opinion that before planting up land with citrus fruit a system of drainage should be thoroughly worked out and the planting done afterwards to avoid the drains. This should be done even if the drains are not to be dug at the time of planting. When the troubles come on later the system of drainage can be applied with the minimum of labour and loss, and the maximum of efficiency since they will generally automatically isolate the infected areas. Diagonal or square planting is a good method to follow when planting up citrus, but it is only sound so long as it does not interfere with good drainage."

PAST OUTBREAKS.

Information collected from past Annual Reports of this Department show that the disease has been present for a long time, and although the localities then affected are not mentioned, it is believed that the areas were not large. It is mentioned in the comprehensive report of Mr. F. W. South, Mycologist of the Imperial Department of Agriculture, who during the years 1911 and 1912, investigated the various root diseases attacking lime trees in Dominica. In the year 1914, a further study of these diseases was made by Mr. South's successor Mr. W. Nowell, D.I.C. Inferences drawn from their reports show that the Black Root diseases *Rosellinia Pepo* and *R. bunodes*, were considered of more importance, but over this period Red Root seems to have caused some anxiety, and we learn that the control measures that were put into effect then, seemed to have proved effective. In the 1915-16 and 1916-17 Reports the position seemed to call for an emphasis of taking prompt measures to combat these diseases, which was being observed on fresh localities. It was shown that

INSECT AND FUNGUS PESTS.

limes were particularly susceptible to attack by this disease, and that if unchecked would relentlessly devastate large areas.

Conditions for its spread in Dominica have been peculiarly favourable during the last few years. These conditions have been primarily due to Withertip which in the inland and wet districts, while not killing the trees outright, rendered them in an unfruitful and debilitated state. This brought about semi-abandonment of the cultivation and impoverishment of the owners, so that when the omnipresent root diseases renewed their attacks, no attempts were made to arrest their progress. The result of this being that it is possible to see acres of lime trees in these districts killed off by the disease, the land no doubt being thoroughly impregnated with spores, which, if that land is ~~being~~ situated on a relatively high level, constitutes a grave danger by reason of the fact that spores are believed to be carried by drainage water and flood. It has also to be borne in mind that the lime cultivations at present bearing economically, that may be described as outside the Withertip area, are in the lower alluvial soils, near to the coast, through which passes the drainage from the diseased areas above. We have to record many cases that have come to our notice that cannot be accounted for by the wash down of spores or infected material, on steep, well drained hillsides and, in certain instances, trees completely isolated. This suggests the carriage of spores by means of some other agency.

Then again it is alike as prevalent in districts of high rainfall (where it apparently attains its optimum of growth) as on the dryer lands near the coast, which rules out seasonal conditions as being specially favourable to its widespread appearance besides the fact of a light rainfall over the last few seasons.

Rosellinias appear negligible in comparison with the Red Root disease.

Energetic measures are being taken by some planters, and the measures advocated by the Mycologist have been broadcasted. Planters have been shown what to be on the look out for and instructed how to examine the root of the trees so that the disease is certified before the removal of the tree.

Symptoms of the disease have been described in the 1912-13 and 1914-15 Reports. To this we must add from our own observations summarised as follows:—

1. That a considerable amount of gumming has been noticed on some infected trees.
2. Conidial fructifications have been prolifically produced.
3. Difficulty in finding mycelia in trees killed off by the disease.
4. Variation in size of mycelia frequently observed.
5. The susceptibility of contact trees.
6. That Sour Orange trees show resistance.
7. The apparent futility of "treating" infected trees.
8. Its occurrence along roadsides and pathways.
9. The importance of prompt measures.
10. The necessity of adequate drainage.
11. That Cocoa and Breadfruit trees which are very susceptible to Rosellinia attack appear immune although in contact with lime trees infected with Red Root.

A visit of the Mycologist from the Imperial College of Tropical Agriculture, Trinidad, has been promised. In the meantime specimens of diseased roots have been sent to him for report from time to time.

All spare reports for the years 1912-13 and 1914-15 have been distributed to the prominent planters together with copies of the Mycologist's Report.

It is to be hoped that the present outbreaks will serve to encourage adequate draining in any new planting that has to be made.

PANAMA DISEASE.

During the year negotiations between the Swift Banana Company and a group of local planters and merchants with the prospective idea of growing Bananas on a large scale in Dominica caused the Department to institute a survey of the Island to ascertain, among other things, the extent of Panama Disease in Dominica. Some very interesting informa-

LIME EXPERIMENTS.

tion was thus obtained which showed that, although the disease was present in various districts, a considerable area could be considered as being totally free and with skilful development a large acreage of first class banana land could be made available.

SPHAERONEMA BLACK SPOT AND BARK ROT.

A disease of cocoa which gave cause for anxiety on a large estate was identified as Sphaeronema Black Spot and Bark Rot.

This disease is associated with wounds caused by careless use of the cutlass when pruning. With the pod infectious black patches appear on nearly ripe pods, and when cut open an appearance of dry rot is seen. Seeds inside the pod are also noticed to be germinating. Saving the pods by timely reapings is advised.

LEUCOPTERA COFFEELLA. GUER.

The prevalence of the coffee leaf miner *Leucoptera coffeella* has to be recorded, and although this pest has long been present in Dominica, it is very much feared by the many who regard it as the agency which stopped coffee cultivation in Dominica many years ago. It is present, however, in all coffee growing countries and in spite of it coffee is able to thrive.

REPORT ON THE LIME EXPERIMENT STATION, DOMINICA.

This Station was started in April, 1913, and the first planting of limes was made in July of the same year. A statement showing the expenditure and the receipts during the thirteen year period is given below :—

							Expenditure.	Receipts.
							£ s. d.	£ s. d.
1913-14	...	...	...	...	...	...	50 0 0	17 9 7
1914-15	...	...	...	...	...	...	70 0 0	61 1 5
1915-16	...	...	...	...	...	...	120 0 0	86 9 10
1916-17	...	...	...	...	...	...	175 0 0	121 2 11
1917-18	...	...	...	...	...	...	175 0 0	180 12 2
1918-19	...	...	...	...	...	...	200 0 0	233 12 8
1919-20	...	...	...	...	...	...	250 0 0	625 6 7
1920-21	...	...	...	...	...	...	320 0 0	741 8 2
1921-22	...	...	...	...	...	...	400 0 0	456 8 3
1922-23	...	...	...	...	...	...	350 0 0	423 1 2
1923-24	...	...	...	...	...	...	350 0 0	515 3 5
1924-25	...	...	...	...	...	...	332 10 8	662 3 9½
1925-26	...	...	...	...	...	...	341 3 4	671 10 10
1926-27	...	...	...	...	...	...	334 17 3	1,135 7 4½
Cost of manures to date..	...	...	...	...	...	...	437 0 0	/
Cost of drainage (from Special Service Grant)	...	...	...	...	...	...	48 3 0	
Head Labourer's house...	...	...	...	...	...	...	60 0 0	
Shed for housing mill, etc.	...	...	...	...	...	...	100 0 0	
Watchman's House	...	...	...	...	...	...	12 10 0	
Total	..	..	..	..	..	..	£4,126 4 3	£5,930 18 2

Supervision, always a considerable charge, has cost nothing in this instance, the work being done by the agricultural officers. A fair amount of assistance has also been given by the two or three agricultural pupils who have been under training during recent years. These pupils were from time to time engaged in sowing green dressings, applying manures, pruning trees and other work of a light character.

It should be clearly understood that the figures of expenditure given above not only maintain the present bearing acres of limes, which includes the gathering, but also covers the cost of upkeep of about five acres of young lime cultivation, eight acres of young coconuts, and a further area of three acres consisting of grapefruit, camphor, avocado pears, etc.

During the fourteen years of its existence the Experiment Station, so far as the disposal of the crop is concerned, has been in the position of a small grower; that is the ripe and green limes have had to be sold in the open market at the current ruling prices. For the purpose of record a table has been prepared which shows the local market rates per barrel of fruit since 1914-15:—

				RIPE LIMES.			
Year.				Barrels of fruit.	Amount received.	Average Rate per barrel.	
					£ s. d.	£ s. d.	
1914-15	...	...	...	222	61 1 5	5 6	
1915-16	...	...	...	315	86 9 10	5 6	
1916-17	...	...	...	541	121 1 1	4 5½	
1917-18	...	...	...	649	180 12 2	5 6¾	
1918-19	...	...	...	1,070	221 2 8	4 1½	
1919-20	...	...	...	1,589	498 1 6	6 5½	
1920-21	...	...	...	2,571	688 17 4	5 4½	
1921-22	...	...	...	2,485	456 8 3	3 8	
1922-23	...	...	...	2,916	423 1 2	2 10¾	
1923-24	...	...	...	2,502	453 15 5	3 7½	
1924-25	...	...	...	2,684	629 11 9½	4 3¼	
1925-26	...	...	...	2,792½	630 7 6	4 6	
1926-27	...	...	...	2,475	1,053 3 8½	8 6½	

				GREEN LIMES.			
Year.				Barrels of fruit.	Amount received.	Average Rate per barrel.	
					£ s. d.	£ s. d.	
1918-19	...	...	...	10	12 10 0	1 5 0	
1919-20	...	...	...	191	127 5 1	13 3 $\frac{3}{4}$	
1920-21	...	...	...	55 $\frac{1}{2}$	52 10 10	18 11	
1921-22	...	...	...	—	—	—	
1922-23	...	...	...	—	—	—	
1923-24	...	...	...	66	61 8 0	18 7	
1924-25	...	...	...	40	32 12 0	16 3 $\frac{1}{2}$	
1925-26	...	...	...	42	41 3 4	19 7 $\frac{1}{2}$	
1926-27	...	...	...	66	82 3 8	1 4 11	

MANURIAL EXPERIMENTS WITH LIMES.

The Experiment Station crop was 2,475 barrels of ripe limes and 63 barrels green limes, all of which were sold in the local market and realised the sum of £1,135. 7. 4½. The total crop for the year was 2,541 barrels of fruit, a slight decrease on that of the previous year.

MANURIAL EXPERIMENTS WITH LIMES.

The main manurial experiments now carried on consist of five plots three times repeated, two series with young limes, and one series with old limes. They are as follows:—

- A. Control manure of nitrogen, phosphates, and potash.
- B. Control. No manure.
- C. Mulch of grass, 5 tons per acre.
- D. - Nitrogen and phosphates.
- E. Nitrogen and potash.

In each case the nitrogen was originally applied in the form of Swift's manure 8 per cent. ammonia at the rate of 4 cwt. per acre, but for a period of three years this manure could not be obtained, and the equivalent in the form of Cotton Seed meal was applied instead. During the past three years dried blood, 14 per cent. ammonia has been used.

The phosphatic requirements of the plots are furnished in the form of basic slag, applied at the rate of 4 cwt. per acre, and the potash by sulphate of potash at the rate of 1½ cwt. per acre. During 1920-21 neither of these manures could be obtained and the falling away of the crop during 1921-22 is in some measure due to the lack of these fertilizers. During recent years sulphate of potash was again available, and as basic slag could not be got, 16 per cent. acid phosphate was used in its place.

The mulch applied is mainly in the form of lemon grass, supplemented by leaves and young shoots of *Gliricidia maculata*. Both forms of mulch are especially grown on what would otherwise be waste grounds in the vicinity of the plots. This system of utilising odd corners, steep hill-sides, and the banks of streams for growing material for application to cultivated areas is strongly recommended in Dominica.

In perusing the plot returns for the past year, allowance must be made for the unequal effect on the different plots, of the severe storm of last July. Its occurrence at a time when the trees were in full bearing, and its stripping off of small immature fruits likewise seriously affect the total returns.

The yields of these plots in barrels of fruit, during the period 1917-18 and 1926-27 are given below:—

LIME EXPERIMENTS.

TEN YEARS' RESULTS OF MANURIAL EXPERIMENTS WITH LIMES.

ORIGINAL SERIES.

Trees planted July, 1913.

Year.	Size of plots.	A.		B.		C.		D.		E.	
		1.		2.		3.		4.		5.	
		Complete manure.		Control.		Mulch.		Nitrogen and Phosphates.		Nitrogen and Potash.	
		per plot.	per acre.	per plot.	per acre.	per plot.	per acre.	per plot.	per acre.	per plot.	per acre.
1917-18	1/4-acre	15 3/4	63	14	56	23 3/4	95	23 3/4	95	7 3/4	31
1918-19	"	60	240	45 3/4	183	71 3/4	287	58 1/2	234	34 3/4	139
1919-20	"	85	340	89 1/2	358	99 1/2	398	88 1/2	354	60 1/2	242
*1920-21	"	118 3/4	475	109 1/4	437	130 1/2	522	117 1/2	470	112	448
1921-22	"	95	380	85 3/4	343	99	396	85 3/4	343	86	344
1922-23	"	88	252	68 1/2	274	85 1/2	332	81 1/2	326	90 1/2	362
†1923-24	"	56 1/4	225	47 1/4	189	69 3/4	279	56 1/2	226	63	252
1924-25	"	51	204	38	152	53 1/4	213	37	148	48 3/4	195
1925-26	"	50 1/4	201	31 1/2	126	50 1/4	201	49 1/4	197	42 3/4	171
1926-27	"	47 1/2	190	28 1/4	113	49 1/4	197	43	172	41 1/2	166

DUPLICATE SERIES.

Trees planted July, 1913.

Year.	Size of plots.	A.		B.		C.		D.		E.	
		6.		7.		8.		9.		10.	
		Complete manure.		Control.		Mulch.		Nitrogen and Phosphates.		Nitrogen and Potash.	
		per plot.	per acre.	per plot.	per acre.	per plot.	per acre.	per plot.	per acre.	per plot.	per acre.
1917-18	1/4-acre	6 3/4	27	10 1/4	41	18	72	6 3/4	27	10 3/4	43
1918-19	"	34 3/4	139	22 1/2	90	42 1/4	169	30	120	38 1/2	154
1919-20	"	57 3/4	231	38	152	69 3/4	279	60 1/2	242	72 1/2	290
*1920-21	"	117	468	81 1/2	326	115 1/2	462	105 3/4	423	115 3/4	463
1921-22	"	79	316	52 1/4	209	85 1/2	342	81	324	94	376
1922-23	"	77	308	45	180	80	320	82	328	97	388
†1923-24	"	55 1/4	221	35 3/4	143	60 1/2	242	54	216	70 1/2	282
1924-25	"	47	188	29 1/4	117	46	184	40 1/2	162	56 1/2	226
1925-26	"	37 3/4	151	21	84	47 1/2	190	50 1/4	201	55 1/2	222
1926-27	"	32 1/2	130	20 1/4	81	44	176	41 1/2	166	48	192

* No phosphates or potash applied that year.

† First complete year under "Withertip" conditions.

LIME EXPERIMENTS.

TRIPPLICATE SERIES.

Old Trees planted 1893.

Year.	Size of plots.	A.		B.		C.		D.		E.	
		11.		12.		13.		14.		15.	
		Complete manure.		Control.		Mulch.		Nitrogen and Phosphates.		Nitrogen and Potash.	
		per plot.	per acre.	per plot.	per acre.	per plot.	per acre.	per plot.	per acre.	per plot.	per acre.
1917-18	1-acre	45	180	29½	119	25½	102	27½	110	22½	91
1918-19	„	70	280	32½	130	23	92	52½	210	34½	138
1919-20	„	89½	359	48½	194	32	128	67½	269	50	200
*1920-21	„	85½	341	52½	210	43½	175	97	388	64½	259
1921-22	„	74	296	42½	170	40	160	79	316	73½	295
1922-23	„	69	276	34	136	37	148	86	344	70	280
†1923-24	„	54½	218	26½	106	45½	181	61½	245	56½	225
1924-25	„	35½	141	21	84	35	140	48½	191	43	182
1925-26	„	40½	161	24½	98	36	144	38½	155	43	182
1926-27	„	39	156	19	76	42	168	52½	209	48½	194

The ten plots of young limes, which cover an area of 2½ acres were planted in July 1913, and are therefore, at the end of March, 1927, thirteen years and nine months old from the time of being placed out in the fields. The crop returns during this period are as follows:—

1917-18	5th year	...	137½ barrels or	55 barrels per acre.
1918-19	6th „	...	438½	„ „ 175 „ „ „
1919-20	7th „	...	721½	„ „ 283 „ „ „
*1920-21	8th „	...	1,124	„ „ 450 „ „ „
1921-22	9th „	...	844½	„ „ 338 „ „ „
1922-23	10th „	...	805	„ „ 322 „ „ „
†1923-24	11th „	...	568½	„ „ 227 „ „ „
1924-25	12th „	...	447½	„ „ 179 „ „ „
1925-26	13th „	...	436	„ „ 174 „ „ „
1926-27	14th „	...	396	„ „ 158 „ „ „

A better idea of the effects of the various manures and cultural measures carried on, may be gained from the table below, in which the plots, each receiving identical treatment in the three series of experiments, are grouped together. This table shows at a glance the actual yield per three plots of a kind grouped together, the calculated yield per acre, and the increase or decrease per acre per annum compared with the previous year.

* No phosphates or potash applied that year.

† First complete year under "Withertip" conditions.

MANURIAL EXPERIMENTS WITH LIMES.

3 COMPLETE MANURE PLOTS. ($\frac{1}{4}$ ACRE EACH.)

Year.	Acre.	Yield in Barrels per $\frac{3}{4}$ Acre.	Calculated yield in barrels per acre.	Increase or decrease per acre compared with previous year.
1917-18	$\frac{3}{4}$ Acre.	67 $\frac{1}{2}$	90	
1918-19	„	164 $\frac{3}{4}$	219 $\frac{3}{8}$	+ 129 $\frac{3}{8}$
1919-20	„	232 $\frac{1}{2}$	310	+ 90 $\frac{1}{8}$
*1920-21	„	321	428	+ 118
1921-22	„	248	330 $\frac{3}{8}$	— 97 $\frac{1}{2}$
1922-23	„	234	312	— 18
†1923-24	„	166 $\frac{1}{2}$	222	— 90
1924-25	„	133 $\frac{1}{4}$	177	— 44 $\frac{1}{2}$
1925-26	„	128 $\frac{1}{4}$	171	— 6 $\frac{3}{8}$
1926-27	„	119	158 $\frac{3}{8}$	— 12 $\frac{1}{8}$
1,814 $\frac{3}{4}$ = Total yield for 10 yrs.				

3 CONTROL PLOTS. ($\frac{1}{4}$ ACRE EACH.)

Year.	Acre.	Yield in Barrels per $\frac{3}{4}$ Acre.	Calculated yield in barrels per acre.	Increase or decrease per acre compared with previous year.
1917-18	$\frac{1}{4}$ Acre.	54	72	
1918-19	„	100 $\frac{3}{4}$	134 $\frac{1}{8}$	+ 62 $\frac{1}{8}$
1919-20	„	176	234 $\frac{3}{8}$	+ 100 $\frac{1}{8}$
*1920-21	„	243 $\frac{3}{4}$	324 $\frac{1}{8}$	+ 89 $\frac{3}{8}$
1921-22	„	180 $\frac{1}{4}$	240 $\frac{1}{8}$	— 84
1922-23	„	147	196	— 44 $\frac{1}{8}$
†1923-24	„	109 $\frac{1}{2}$	146	— 50
1924-25	„	88 $\frac{1}{2}$	118	— 28
1925-26	„	77	102 $\frac{3}{8}$	— 15 $\frac{1}{8}$
1926-27	„	94 $\frac{1}{2}$	126	+ 23 $\frac{1}{8}$
1,270 $\frac{3}{4}$ = Total yield for 10 yrs.				

* No phosphates or potash applied that year.

† First complete year under "Withertip" conditions.

MANURIAL EXPERIMENTS WITH LIMES.

3 MULCH PLOTS. ($\frac{1}{4}$ ACRE EACH.)

Year.	Acre.	Yield in Barrels per $\frac{3}{4}$ Acre.	Calculated yield in barrels per acre.	Increase or decrease per acre compared with previous year.
1917-18	$\frac{3}{4}$ Acre.	67 $\frac{1}{4}$	89 $\frac{3}{8}$	
1918-19	„	138	184	+ 94 $\frac{1}{8}$
1919-20	„	201 $\frac{1}{4}$	268 $\frac{1}{8}$	+ 84 $\frac{1}{8}$
*1920-21	„	289 $\frac{3}{4}$	386	+ 117 $\frac{3}{8}$
1921-22	„	224 $\frac{1}{2}$	299 $\frac{1}{8}$	+ 86 $\frac{3}{8}$
1922-23	„	212	282 $\frac{3}{8}$	- 16 $\frac{3}{8}$
†1923-24	„	175 $\frac{3}{4}$	234 $\frac{1}{8}$	- 48 $\frac{1}{8}$
1924-25	„	135	180	- 54
1925-26	„	133 $\frac{3}{4}$	178 $\frac{1}{8}$	- 1 $\frac{3}{8}$
1926-27	„	135 $\frac{1}{4}$	180 $\frac{1}{8}$	+ 2

1,712 $\frac{1}{2}$ = Total yield for 10 yrs.3 NITROGEN AND PHOSPHATE PLOTS. ($\frac{1}{4}$ ACRE EACH.)

Year.	Acre.	Yield in Barrels per $\frac{3}{4}$ Acre.	Calculated yield in barrels per acre.	Increase or decrease per acre compared with previous year.
1917-18	$\frac{3}{4}$ Acre.	64 $\frac{3}{4}$	86 $\frac{1}{8}$	
1918-19	„	141	188	+ 101 $\frac{3}{8}$
1919-20	„	216 $\frac{1}{4}$	288 $\frac{1}{8}$	+ 100 $\frac{1}{8}$
*1920-21	„	320 $\frac{1}{4}$	427	+ 138 $\frac{3}{8}$
1921-22	„	240 $\frac{1}{2}$	320 $\frac{3}{8}$	- 106 $\frac{1}{8}$
1922-23	„	250	333 $\frac{1}{8}$	+ 12 $\frac{3}{8}$
*1923-24	„	171 $\frac{3}{4}$	299	- 104 $\frac{1}{8}$
1924-25	„	126	168	- 61
1925-26	„	138 $\frac{1}{4}$	184 $\frac{1}{8}$	+ 16 $\frac{1}{8}$
1926-27	„	136 $\frac{3}{4}$	182 $\frac{1}{8}$	- 2

1,805 $\frac{1}{2}$ = Total yield for 10 yrs.

* No phosphates or potash applied that year.

† First complete year under "Withertip" conditions.

MANURIAL EXPERIMENTS WITH LIMES.

3 NITROGEN AND POTASH PLOTS. ($\frac{1}{4}$ ACRE EACH.)				
Year.	Acre.	Yield in Barrels per $\frac{3}{4}$ Acre.	Calculated yield in barrels per acre.	Increase or decrease per acre compared with previous year.
1917-18	$\frac{3}{4}$ Acre.	41 $\frac{1}{4}$	55	
1918-19	„	107 $\frac{3}{4}$	134 $\frac{3}{8}$	+ 88 $\frac{3}{8}$
1919-20	„	183	244	+ 100 $\frac{1}{8}$
*1920-21	„	292 $\frac{1}{2}$	390	+ 146
1921-22	„	253 $\frac{3}{4}$	338 $\frac{1}{8}$	- 51 $\frac{3}{8}$
1922-23	„	257	342 $\frac{3}{8}$	+ 3 $\frac{3}{8}$
†1923-24	„	190	253 $\frac{1}{4}$	- 89 $\frac{1}{2}$
1924-25	„	148	197	- 56
1925-26	„	141 $\frac{1}{4}$	188 $\frac{1}{8}$	- 8 $\frac{3}{8}$
1926-27	„	138	184	- 4 $\frac{1}{8}$
		1,752 $\frac{1}{2}$ = Total yield for 10 yrs.		

The falling off in yields on the above mentioned plots was entirely due to the presence of the Withertip disease of limes which was first noticed in the Experiment Station in July, 1922, and during the past year partly attributable to the Storm of the 22nd July.

Judging by Dominica standards, all the plots, including those receiving no manure have done well. In the latter instance the influence of good cultural measures, apart from the application of manures must be evident to all who study the table of crop returns.

The mulched plots, although not giving the highest return, are of special interest to lime growers. As is well known this material is without the forcing effect of concentrated fertilizers, but it is cumulative in its effect. It is practically certain that the standard of health of the lime tree is higher in the mulched than in any of the plots receiving concentrated manures only. This material which is so abundant in the Island, should be the chief manure used by cultivators.

OTHER MANURIAL EXPERIMENTS PLOTS.

Both seedling and spineless limes budded on sour orange stock, and ordinary seedlings have been under experiment since 1914, and occupy one acre of land.

The acre is divided up into $\frac{1}{4}$ acre plots: two plots of common limes budded on sour orange stocks: one plot of spineless limes on the same kinds of stock: and one plot of ordinary seedling limes for comparison.

During 1917-18 and 1918-19 the trees in each plot received a small dressing of organic nitrogen at the rate of 4 cwt. per acre. During the first three years of their existence, No. 1 budded plot (see table below,) was grown with Tephrosia as a green dressing whilst No. 2 budded plot was grown in the usual way with weeds and grass, which was occasionally weeded. The spineless limes had green dressings of horse beans, and the seedling limes were clean weeded. Early in 1919-20 each plot received a complete manure of nitrogen, phosphates and potash. It is intended to maintain this series as complete manure plots. The crop yields of the four plots since fruiting commenced are as follows:—

* No phosphates or potash applied that year.

† First complete year under "Withertip" conditions.

MANURIAL EXPERIMENTS WITH LIMES.

TEN YEARS RESULTS OF EXPERIMENTS CONDUCTED WITH SPINELESS AND COMMON LIMES, BUDDED ON SOUR ORANGE STOCKS, AND WITH COMMON SEEDLING LIMES.

PLANTED JULY, 1914.

SPINELESS LIMES BUDDED ON SOUR ORANGE STOCKS.

Year.	Size of plot.	Actual yield in barrels per plot.	Calculated yield in barrels per acre.
1917-18	$\frac{1}{4}$ Acre.	6 $\frac{1}{2}$	26
1918-19	„	18 $\frac{1}{4}$	73
1919-20	„	34	136
*1920-21	„	46	184
1921-22	„	45 $\frac{1}{2}$	182
1922-23	„	62	248
†1923-24	„	26	104
1924-25	„	24 $\frac{3}{4}$	98 $\frac{3}{4}$
1925-26	„	29 $\frac{1}{4}$	117
1926-27	„	16 $\frac{1}{2}$	66

COMMON LIMES BUDDED ON SOUR ORANGE STOCKS. (No. 1.)

Year.	Size of plot.	Actual yield in barrels per plot.	Calculated yield in barrels per acre.
1917-18	$\frac{1}{4}$ Acre.	8	32
1918-19	„	34 $\frac{3}{4}$	139
1919-20	„	59 $\frac{3}{4}$	159
*1920-21	„	98 $\frac{1}{2}$	394
1921-22	„	91 $\frac{3}{4}$	367
1922-23	„	132	528
†1923-24	„	59	236
1924-25	„	59 $\frac{3}{4}$	238 $\frac{3}{4}$
1925-26	„	68 $\frac{1}{4}$	273
1926-27	„	48 $\frac{1}{2}$	194

* No phosphates or potash applied that year.

† First complete year under "Withertip" conditions.

MANURIAL EXPERIMENTS WITH LIMES.

COMMON LIMES BUDDED ON SOUR ORANGE STOCKS. (No. 2.)

Year.	Size of plot.	Actual yield in barrels per plot.	Calculated yield in barrels per acre.
1917-18	$\frac{1}{4}$ Acre.	6	24
1918-19	„	$13\frac{3}{4}$	55
1919-20	„	$31\frac{1}{4}$	125
*1920-21	„	86	344
1921-22	„	$73\frac{3}{4}$	295
1922-23	„	121	484
†1923-24	„	$65\frac{1}{4}$	261
1924-25	„	$67\frac{1}{4}$	269
1925-26	„	76	304
1926-27	„	$57\frac{1}{4}$	229

COMMON SEEDLING LIMES.

Year.	Size of plot.	Actual yield in barrels per plot.	Calculated yield in barrels per acre.
1917-18	$\frac{1}{4}$ Acre.	Nil.	Nil.
1918-19	„	$16\frac{3}{4}$	67
1919-20	„	$22\frac{3}{4}$	91
*1920-21	„	61	244
1921-22	„	58	232
1922-23	„	$64\frac{1}{2}$	258
†1923-24	„	$55\frac{3}{4}$	223
1924-25	„	$50\frac{1}{2}$	201
1925-26	„	$42\frac{3}{4}$	169
1926-27	„	40	160

* No phosphates or potash applied that year.

† First complete year under "Withertip" conditions.

MANURIAL EXPERIMENTS WITH LIMES.

RECENTLY STARTED MANURIAL EXPERIMENT PLOTS.

Three new series, each consisting of three plots, were started early in 1921. The treatment given in the first series is repeated three times. The plots are numbered 16 to 24. The treatment is as follows:—

SERIES. I.	Plot 16.	Ready mixed complete fertilizer, (8 per cent nitrogen 10 per cent phosphates and 4 per cent potash), at the rate of 500 lb. per acre (with mulch—2½ tons per acre.)
	Plot 17.	Control. (No fertilizer or mulch.)
	Plot 18.	Ready mixed complete fertilizer, (8 per cent nitrogen, 10 per cent phosphates and 4 per cent potash), at the rate of 1,000 lb. per acre (with mulch—2½ tons per acre.)

The addition of nine plots brings the number of experiment plots now being conducted at the Station, up to thirty. The twenty-one plots running before the new experiments were started involved no less than 1,809 separate measurements and records, and average of eighty-six pickings per plot. With the addition of three new series this work connected with measuring and recording will be greatly increased involving as it will close on 2,600 measurements each year.

The following tables show the returns for the five years since the commencement of the experiments:—the yields being expressed in barrels.

SERIES I.

Year.	A. (16)		B. (17)		C. (18)	
	Complete Manure.		Control.		Complete Manure.	
	(500 lb. Mixed Fertiliser per acre.)		(No Manure.)		(1,000 lb. Mixed Fertiliser per acre.)	
	per plot.	per acre.	per plot.	per acre.	per plot.	per acre.
1921-22	17	60½	10	30	20	68
1922-23	46	164	28¼	85	65½	225½
1923-24	50	197½	36½	110½	64¾	223
1924-25	55½	199	46¾	141½	66¼	228
1925-26	51	182½	32¾	99	56	193
1926-27	51	182½	28	84	58¼	201

MANURIAL EXPERIMENTS WITH LIMES.

SERIES II.

Year.	D. (19)		E. (20)		F. (21)	
	Complete Manure.		Control.		Complete Manure.	
	(500 lb. Mixed Fertiliser per acre.)		(No Manure.)		(1,000 lb. Mixed Fertiliser per acre.)	
	per plot.	per acre.	per plot.	per acre.	per plot.	per acre.
1921-22	6½	23	8¾	22	3½	10½
1922-23	18½	65	31½	80	42½	128
1923-24	32	114	54	138½	62¾	190
1924-25	51½	184	57¾	148	66	200
1925-26	69½	248	44	112¾	69½	210¾
1926-27	58	207	47½	122	64½	194½

SERIES III.

Year.	G. (22)		H. (23)		I. (24)	
	Complete Manure.		Control.		Complete Manure.	
	(500 lb. Mixed Fertiliser per acre.)		(No Manure.)		(1,000 lb. Mixed Fertiliser per acre.)	
	per plot.	per acre.	per plot.	per acre.	per plot.	per acre.
*1921-22	36½	101½	31	91	45¾	147½
1922-23	23½	65	21¾	64	22¾	73
1923-24	22¾	63	20¾	61	22¾	73
1924-25	29½	81	20½	60	25	80½
1925-26	35	97½	21	61¾	32	103
1926-27	38½	107	22½	64¾	31½	101½

The areas of all the above plots are slightly over $\frac{1}{4}$ of an acre each, therefore the value in barrels per acre has been given to the nearest fraction.

* Higher returns due to some seedling limes which had not been removed from amongst the budded plants.

AGRICULTURAL LOANS

GENERAL OBSERVATIONS.

As mentioned in the report on the Lime Industry the storm of the 22nd July had a disastrous effect on the first Lime Crop which promised to be well above the average. With the high prices which ruled for limes, this represented a considerable loss to revenue. Altogether 130 full bearing lime trees were blown over, most of them becoming a total loss. This has affected to some extent the crop bearing records kept by the Department, as some plots were more seriously damaged than others. The plots suffering most being Plots Nos. 14, 16, 17, 18, 19, 20. This storm accounts for the decrease in the total yields which is by a small margin the lowest recorded since 1922.

The first outbreak of Red Root disease in the Experiment Station was noted on the 29th March, 1927, in a plantation of young limes called Gomez's Field.

Two infected trees were immediately removed and isolation measures taken.

In order gradually to bring all the Department's land under cultivation an extension was made when about an acre of steeply sloping land toward the Western end was cleared, drained and planted with limes.

Attention must be called to the relatively high yield of the West Indian limes budded on Sour Orange Stocks. These plots are situated in that part of the Station most affected by Withertip, despite which they persistently give the highest returns. Compared with seedling limes they make a quicker and stronger growth, are of better habit, and not so susceptible to dieback and root troubles. The strong rooting quality of this stock was strikingly demonstrated when during last years storm not a single tree was blown over or uprooted. This alone should vindicate its right to be regarded the stock for the West Indian lime on suitable soils.

The first recognition of its qualities as a stock for the West Indian Lime can be attributed to this Department's experiments.

CITRUS VARIETIES ON TRIAL.

The progress of the various varieties was reviewed and summarised in an address delivered by the Agricultural Superintendent to the Agricultural & Commercial Society in January, 1927. A copy of this address is published for general information as an appendix to this Report.

AGRICULTURAL LOANS AND GRANTS IN AID.

Resulting from representations made by His Excellency the Governor and the Local Government, Sir Francis Watts, K.C.M.G., late Principal of the Imperial College of Tropical Agriculture and Commissioner for Agriculture in the West Indies, was appointed by the Secretary of State for the Colonies to enquire concerning the Agricultural and general conditions in Dominica, with a view to making recommendations concerning steps to be taken for their amelioration. Sir Francis Watts visited Dominica for the purpose during November and December, 1924, and again in February, 1925. His report on his investigations was submitted to the Secretary of State for the Colonies in April, 1925, and the recommendations contained therein were approved of in principle by His Majesty's Government in March, 1926. The report which, has been printed and circulated for general information, contains recommendations which, in the opinion of Sir Francis Watts, will ultimately lead to the general economic improvement of the Island. Amongst the recommendations made, other than those circulated to ensure a diversification of the Island's industries, are suggestions to provide financial assistance for the following purposes :—

- (a) To provide monetary help for the cultivation of approved crops.
- (b) For the establishment of coastal communication between Roseau and the north-eastern coast, and as far as may be possible with outlying districts.
- (c) For the establishment of a Peasants Information Bureau and Produce Exchange.
- (d) Towards improving the bridle roads and traces connecting peasants' holdings.

With reference to (a) a Board called the "Loan Board for Approved Industries" was formed on the 18th May, 1926, for the purpose of administering funds provided for monetary assistance to planters in the shape of long and short loans for approved crops.

GOMIER STEWART TRUST ESTATE.

The personnel of the Board is as follows :—

Official Members.

Hon. F. B. B. Shand, Crown Attorney,
Hon. H. A. Bascom, Treasurer,
Secretary. R. B. Skinner, Esq.
Expert Adviser. F. G. Harcourt, Esq., Agricultural Superintendent.

Unofficials.

Hon. H. H. V. Whitchurch,
Hon. J. R. H. Bridgewater,

It is the duty of the Agricultural Superintendent, assisted by his senior assistants when necessary, to investigate all applications for loans and to submit a report, giving observations in full concerning the estate, together with suggestions for the Board's consideration. This necessitates considerable extra work and travelling; more especially as numerous applications for loans are being received from the peasant class, and great caution has to be exercised in these investigations, particularly as regards the security offered. Loan Board work is to be regarded as the principle work of the Department at the present time, further particulars of which cannot here be mentioned as all Loan Board matters are treated in a highly confidential manner.

With reference to (b) i.e. Coastal communication. This question is receiving the very careful consideration of the Government, for it is realised that an improved coastal service is of paramount importance to planters situated on the Windward side of the Island. Considerable difficulty is being experienced in obtaining the services of a suitable vessel, but signs are evident that this will shortly be overcome.

With reference to (c) i.e. Peasants Information Bureau and Produce Exchange. This service, although only started in July, 1926, is proving of considerable assistance to the peasants and small planters community. The functions of this office, among others, are, to obtain and circulate information as to markets for all kinds of produce, prices ruling for same, and further to assist peasants and small planters to dispose of their commodities to the best advantage. Where necessary, advances are made to growers on produce of a non-perishable nature, prior to shipment, and it is hoped eventually to build up a considerable overseas trade in the interest of small proprietors.

The Bureau is under the control of the Agricultural Department, Mr. J. C. Macintyre, Peasants Adviser, being the Officer in Charge. His report covering the period to the 31st March, 1927, which is given at the end of this report as Appendix II., clearly shows that considerable progress has been made by this office.

With reference to (d) the work of improving bridle roads and traces to peasants' holdings has been commenced in the various country districts. This work is being undertaken by the Public Works Department.

GOMIER STEWART TRUST ESTATE.

The Government of Dominica, by an Order of the Court, is a Trustee of this Estate, which is a large property consisting of 200 acres, more or less, situate in the Parish of St. George, on the North-easterly boundary of Wall House Estate.

A condition of the trusteeship is that it should be held for the benefit of the poor of Roseau.

It has been decided that the estate should be placed under the control of the Agricultural Department and half of the property rented out to peasants in plots of four to five acres and the remaining half to be rented to the present tenant of the whole estate.

The estate has been surveyed and plotted out accordingly and during the year 30 plots were allotted to peasants.

The rent of these plots is from 10/- per acre upwards according to the quality of land, and when collected this rent money is set aside to be utilised for the benefit of the poor and in such manner as the Government may decide.

It is a condition that tenants shall beneficially occupy the land to the satisfaction of the Agricultural Superintendent, who may terminate any tenancy by giving three months notice to the tenant.

Satisfactory progress has to be reported.

DETAILS OF ADMINISTRATION.

DETAILS OF ADMINISTRATION.

EXPENDITURE.

The votes for the Agricultural Department for the year were as follows:—

	£.	s.	d.
Salaries Curator, Assistant Curator, } Second Assistant Curator, Clerk, }	1,381	0	0
Foreman and Watchman.			
Contingencies	10	0	0
Travelling Expenses... ..	100	0	0
Maintenance	260	0	0
Cultivation Saleable Products	275	0	0
Fumigation of Imported Plants... ..	5	0	0
Maintenance Public Gardens	15	0	0
Purchase of Special Manures	120	0	0
Printing Reports, etc.	40	0	0
Experiment Station	390	0	0
Purchase of seeds	25	0	0
Trial shipments of Fruit	20	0	0
Chemicals and Apparatus	25	0	0
Telephone Rental	20	0	0
Uniform for Watchman	3	0	0
Field Experiments	50	0	0
Upkeep of Horses and Mules	30	0	0
Agricultural Instructions	497	0	0
	<u>£3,266</u>	<u>0</u>	<u>0</u>

The actual expenditure during the year under the above heads was £2,540. 7. 7.

ADDITIONAL EXPENSES FOR SPECIAL SERVICES.

	£.	s.	d.
Storm Damage	139	5	4
Purchase of Horses	14	0	0
Grant for free distribution of economic plants	112	17	10
	<u>£266</u>	<u>3</u>	<u>2</u>

RECEIPTS.

The receipts under the various heads were as follows:—

	£.	s.	d.
Limes	1,135	7	4½
Cocoa	122	19	0½
Plants	129	8	10½
Fruit	64	11	9
Nutmegs	10	17	0
Coconuts	6	18	8
Onion seed	17	7	10
Vegetable seed	9	9	10
Tobacco seed	3	10	0
Wood	9	14	11
Miscellaneous	9	4	5½
Laboratory Receipts... ..	8	2	6
	<u>£1,527</u>	<u>12</u>	<u>3</u>

DETAILS OF ADMINISTRATION.

STAFF CHANGES.

Mr. F. L. Squibbs, late Assistant Superintendent of the Botanical and Forestry Department, Hong Kong, was appointed Second Assistant Curator, and he arrived in the Presidency to take up his duties on the 4th September, 1926.

Mr. J. W. Wright, Assistant Curator, was granted three weeks sick leave from the 17th November to 7th December, 1926, and three months vacation leave commencing 28th February, 1927.

Mr. J. J. McDowell was appointed Plant Inspector taking up his duties on the 29th January, 1927.

ADDITIONS AND REPAIRS TO BUILDINGS ETC.

The increase in staff necessitated an extension of the Office premises, therefore a new room 12 x 12 was added.

The whole shelter protecting the Economic Nursery having collapsed during the storm of the 22nd July, was entirely rebuilt, likewise a renewal made of the shelter supports in Nursery No. 5.

Repainting and some repairs were carried out to the wooden fencing in the Botanic Gardens, the guttering of the Fountain Shelter and all the Entrance Gates.

The Cookhouse and servants living room attached to the quarters of the Assistant Curator on Morne Bruce were renovated.

One of the Morne Bruce Buildings was temporarily converted for use as a Tobacco drying house.

The supports and staging of one of the propagating houses were refitted and painted.

Premises acquired for the Peasants' Information Bureau were altered and fitted to meet the requirements of this new line of work.

CORRESPONDENCE AND DISTRIBUTION OF INFORMATION ON
AGRICULTURAL MATTERS.

Seven hundred and four letters were despatched from the Department's Office and numerous Minute Papers were dealt with.

A large number of copies of the address delivered to the Agricultural & Commercial Society by the Agricultural Superintendent on "Lime Varieties in Dominica" were distributed.

For the instruction of planters, in methods of combating root diseases, all the spare copies of the 1912-13 and 1914-15 reports were circulated to planters together with the Mycologist's report on specimens submitted for his examination and advice as to control.

Various pamphlets on Agricultural matters were distributed to planters interested.

PLANTS AND SEED EXCHANGE.

Contributions of seeds and plants were received from the following:—T. Tangerman, Miami, Florida; Hon. A. E. Collens, F.I.C., F.C.S., Antigua; Director, Royal Botanic Gardens, Kew; Agricultural Superintendent, Leeward Islands; Imperial Commissioner of Agriculture, Trinidad; Holger Johanson, Agronomist, Canal Zone Supply Department; Commissioner of Agriculture, Calcutta; Botanic Gardens, Montserrat; Agricultural Department Antigua; Agricultural Department, Trinidad; H. G. Seaford, Esquire; Agricultural Department, Hawaii; Department of Agriculture, St. Lucia; J. Sowray, Esquire.

The Department tenders its best thanks for these welcome contributions.

Seeds and plants were sent to:—Agricultural Department, Barbados; T. E. Peters, Esquire, Antigua; Agricultural Department, Antigua; Government House, St. Kitts; Hon. A. E. Collens, F.I.C., F.C.S., Antigua.

THE LIME INDUSTRY.

OFFICIAL VISITS ETC. TO THE DEPARTMENT.

Mr. F.H.S. Warneford, M A., B.Sc., A I.C., F.C.S., Assistant Chemist, Antigua, arrived in the Island on the 13th of August, and returned on the 5th September.

His Excellency the Governor and Lady Fiennes, O.B.E., arrived in the Island on the 10th January, and left on the 15th.

During their stay His Excellency and Lady Fiennes visited the Gardens.

Hon. A.E. Collens, F.I.C., F.C.S., Government Chemist & Superintendent of Agriculture for the Leeward Islands, arrived in the Island on the 7th March, and sailed for Antigua on the 25th March.

AGRICULTURAL INSTRUCTION AND VISITS TO ESTATES.

The number of Pupils receiving instruction at the Botanic Gardens has now been increased to six. The pupils are trained in the elementary principles of Agriculture and in addition to practical work receive a course of lectures on the theory of such work.

Periodical visits were made to all parts of the Island, particular attention being paid to the peasants whose holdings often lie in the remote parts of the Island.

The travelling now being performed by the Officers of the Department is very considerable, owing to the many inspections that have to be undertaken on behalf of the Loan Board.

The services of the Officers of the Department are always available when sought by planters.

The thanks of the Department are tendered for the kind hospitality of planters during these visits.

LABORATORY WORK.

The following tests were made by Officers of the Department during the period 1st April, 1926, to the 31st March, 1927.

A small fee is charged for all tests made.

Raw Lime Juice	17
Concentrated Lime Juice	20
Bay Oil	95
Other Oils	3

RAINFALL.

The rainfall at the Botanic Gardens for 1926 amounted to 59.36 being 16.33 inches less than the previous year and 14.71 below the average annual precipitation for the last twenty-seven years which is 74.17.

THE LIME INDUSTRY.

The export figures for the year 1926 show a decrease of 16,000 barrels of limes when compared with those of the previous year. This decrease is largely attributable to a severe storm which struck Dominica during the night of the 22nd July, 1926. Lime estates were particularly affected, hundreds of trees were completely destroyed and a greater number were twisted and partially torn from the ground. The actual loss of fruit could not be determined as heavy rains carried a large quantity to the sea, and immature limes of no economic value were stripped from the trees.

The loss experienced by planters from this catastrophe was to some extent alleviated by the unprecedented rise in the prices of limes and lime oils, later in the year.

Ripe limes realised up to 12/- per barrel as against 4/8 the previous year. Lime oils realised up to 31/- per lb. for distilled and 40/- per lb. for expressed. There was a marked drop in prices towards the end of the main crop.

THE LIME INDUSTRY.

The crops shipped since 1919, calculated in barrels of fruit and expressed in round numbers, are recorded below :—

1919	..	..	402,000	} Prior to appearance of Withertip.
1920	..	.	369,000	
1921	..	..	516,000	
1922	..	..	400,000	
1923	..	..	228,000	
1924	..	..	424,000	
1925	..	..	230,000	
1926	..	..	214,000	

The following table calculated on the usual basis shows the disposal of the crop under the various heads :—

Product.	Barrels of Fruit.	Approximate percentage of total crop.
Concentrated juice	156,021	73.
Raw juice	36,834	16.76
Fresh limes	21,171	9.9
Pickled limes	287	.13
Lime juice cordial	413	.19

Except for the storm mentioned above the weather conditions were generally favourable throughout the year.

The export of products of the lime industry during 1926 is recorded below :—

Product.	Quantity.	Value. £
Concentrated lime juice	104,014 gallons	25,105
Raw lime juice	268,760 ,,	11,376
Lime juice cordial	2,275 ,,	474
Fresh limes	21,171 barrels	12,651
Pickled limes	278 ,,	215
Essential oil (distilled)	33,471 lbs.	26,559
Otto of limes (hand- pressed or ecuelled)	9,381 ,,	11,175
		£87,555

50 gallons of concentrated juice represents 75 barrels of lime fruits: 7½ gallons of raw juice represents 1 barrel of lime fruits: 1 ton of citrate of lime is equivalent to 266 barrels of lime fruits: 1 ton of citric acid is equivalent to 400 barrels of lime fruits: 1 gallon of lime juice cordial represents 5½ barrels of lime fruits.

MINOR INDUSTRIES.

In spite of withertip disease, the West Indian lime is still being profitably grown on the drier lands of the Leeward coast and the cultivation of this crop is being extended in these localities. Growers are therefore particularly urged to pay the utmost attention to these cultivations and see that the land is properly tilled and drained before planting. It should always be remembered that the treatment afforded to the young trees before they reach a bearing age influences the yields to be expected later. Furthermore weakness of the tree and tissue causes the plant to be particularly susceptible to any disease, therefore the importance of keeping up the health and vitality of the tree by the judicious use of fertilizers and mulches and the adoption of improved cultural methods, cannot be exaggerated. Strong, vigorous trees, even under unfavourable weather conditions, are more likely to be resistant to Withertip even though it be always present. This is well evidenced by the high returns of fruit still reaped from the Department's Experiment Station since the advent of this disease to Dominica.

The lime industry during the year received a further blow by outbreaks of Red Root Disease (*Sphærostilbe* sp.) which occurred not only on semi-abandoned estates, but on estates which have proved themselves profitable in spite of Withertip disease.

Although control measures were immediately put into effect, these have not appeared sufficient to check to any appreciable extent, the spread of the disease, which is extremely puzzling.

The disease is at present confined to that section of the island which suffered most from the severe storm in July, and no doubt the tearing and wrenching of the roots by the wind, together with the debilitated state of the trees, which in many instances is due to the semi-abandonment of the cultivations, are factors particularly favourable for its spread.

It has been particularly noticed that the Sour Orange is highly resistant to the disease, and planters, especially those situated in the areas of the present outbreaks, are strongly advised to plant in future limes budded on the Sour Orange Stock. The initial cost of planting may be very little higher than that of establishing seedling limes, but among the advantages to be obtained, other than resistance to Red Root disease, are a higher resistance to winds, and with proper cultivation a much larger yield of fruit per acre. A glance at the returns from the budded lime plots in the Department's Experiment Station will show that much higher yields have been consistently obtained from these plots, even since the advent of Withertip.

It is a pity that growers will not realise in spite of the proof given in these reports for several years, that the day of the seedling lime is gone and that the future of the Lime Industry in Dominica depends to a great extent on the gradual planting up in suitable areas of limes budded on the Sour Orange Stock.

MINOR INDUSTRIES.

FRUIT INDUSTRY.

This industry received a serious set back during the year through lack of suitable steamship facilities between the West Indian Islands and Canada.

With the signing of the West Indian-Canada Trade Agreement however an improved service is assured for the future, and undoubtedly a larger export of fruit will result.

Progress however is likely to be slow, unless there is co-operation between shippers, not only in Dominica but in all the West Indian Islands, to assure continuity of supply and standardisation of quality. Trial shipments of Dominica Grapefruit to Canada have been very highly reported on, but such quantities cannot be shipped at present to assure reliance by importers when the questions of continuity of supply and competition with American fruit are concerned, and furthermore, the railway transport charges are so high on lots of produce less than a car load, that shipments are prevented from reaching other than the ports of call by the steamers. Meanwhile much interest in fruit growing is being displayed locally and the Agricultural Department has had to establish new nurseries to meet the demand for plants.

MINOR INDUSTRIES.

A most important step in connection with this industry has to be recorded, namely the passing of an Ordinance to regulate the examination and exportation of fruit and to prohibit the shipment of defective fruit. Under this Ordinance it is unlawful for any person to pack or cause to be packed in the Presidency for shipment out of the Presidency, or to ship or deliver for shipment out of the Presidency, any immature or overripe fruit, or any fruit affected by insect, nematode or fungus pest, rots, bruises, sunburn or other serious defect. It is also stipulated that all fruit for export must be packed in standard containers on which must be marked the name or identification mark of the shipper.

The Ordinance came into operation on the 1st September, 1926, and Officers of the Agricultural Department are required to act as Fruit Inspectors.

BANANAS.

During the year the Agricultural Superintendent visited St. Lucia on two occasions and interviewed Mr. Roberts, the representative of the Swift Banana Company, with a view of ascertaining if that Company would consider extending their operations to include Dominica.

The outcome of these visits was that in December, 1926, Mr. Swift and Mr. Roberts visited Dominica and inspected the Fond Hunt lands which are admirably suited for Banana cultivation. These gentlemen, were keenly interested, and a local Syndicate was formed for the purpose of acquiring about 2,000 acres of these lands.

At a subsequent visit by Mr. Roberts a contract was signed between the local Syndicate and the Swift Banana Company, on the 22nd January, to supply all fruit grown on these lands to the Company at a fixed price over a period of years.

The Swift Banana Company also undertook to establish buying stations at suitable places throughout the Presidency and to provide a fortnightly steamship service for the carriage of the fruit.

Early in February, 1927, however, the Swift Banana Company decided to suspend operations in the West Indies.

The local Company had been put to some expense in acquiring land, but fortunately had not commenced planting operations. Considerable planting had however been done by the peasantry and the news of the Company suspending operations created a general feeling of depression which was to be naturally expected after the prospects of extending this industry had appeared so bright.

COCONUTS.

The export of copra for the year 1926 not only exceeds by a large margin that of the previous year, but more than doubles that of the years 1923 and 1924. This is most satisfactory, serving as it does as an indication that the commercial preparation of coconut products is now being understood.

A great impetus to planting has been given by the Agricultural Department in establishing coconut nurseries in country districts in order that selected planting material may be more easily obtained by growers.

Comparison of plant distribution show that during the year 9,169 coconut plants were sent out as against 1,872 for the previous year, and in the coming year this increase is expected to be much greater owing to the new scheme of free distribution of economic plants.

Lime cultivations abandoned by "Withertip" are now being gradually cleared and planted with coconuts where soil and situation are suitable.

COCOA.

Better prices obtained for cocoa during the year have induced growers to pay more attention to their cultivations and on several estates they have cleaned their old plantations and planted up new areas.

There exists a fair demand for planting material and the Department is at present engaged in the raising of seedlings of selected varieties.

MINOR INDUSTRIES.

COFFEE.

There is at present an awakening of interest by both large and small growers in this crop.

The Department has introduced the Arabian variety, San Ramon, also the Liberian variety, Excelsa. Plants of these two varieties have been distributed for trial on a field scale.

The Robusta variety which has been recommended for Dominica has also been raised in considerable quantities. With good soil management there is no real obstacle in the way of Dominica succeeding with Coffee if the will to continue is evidenced during periods of low prices which might ensue.

VANILLA.

The development of this crop is proceeding steadily, and an excellent quality of vanilla is being produced. Low prices have prevailed which has caused growers to reduce to a minimum the fertilisation of flowers.

NUTMEGS.

The sheltered pockets that are to be found in all the Dominican valleys are eminently suited for the growth of the nutmeg tree. While it is a matter of regret that more attention has not been paid to this crop in the past, the demand for planting material has during the past few months been greater than at any previous time.

BAY OIL.

This industry is progressing steadily. The unfavourable marketing conditions that obtain, by which local dealers have often to hold their stocks of oil over considerable periods, militate against any rapid development.

GINGER.

This crop has during the last three years been taken up on a considerable scale and rhizomes have been well up to standard size. Parts of the Island are most suitable for this crop but the following setbacks have to be recorded :—

1. The low prices prevailing during the year.
2. The difficulty of drying and curing in the wetter districts of the Island.
3. The disinclination of the peasantry to carry out the scraping necessary in the production of white ginger.

There is however a nucleus of good planters who are persevering with this crop.

A quantity of Black Ginger shipped to England realised 30/- per cwt and shipments of White Ginger realised at the rate of 50/- per cwt.

TOBACCO.

The cultivation and drying of tobacco is now well understood and a good quality leaf is produced.

Difficulty with germination of seed has been experienced by growers who have not considered the careful measures advised to ensure the proper preparation and protection of their seed beds. The Department, however, assisted in this respect and over 6,000 seedlings were distributed free to the various growers.

In order to procure the varieties most suitable for the various grades of manufacture, the Department obtained seed through Kew from the Dutch East Indies, and an experiment plot was started on the Morne. Careful records of the different varieties were kept and samples of each are being sent to the Imperial Institute for report. Grown side by side with the two varieties grown in Dominica, some of the varieties show much promise from the point of view of growth and leaf texture, and the Report of the Imperial Institute should material assist in the solution of the types most suited.

PARA RUBBER.

The Tobacco Growers Association have been successful in their manufacture of a Black Leaf Tobacco and "Long Tom" Cigars and are ready purchasers of all good dried leaf brought to them.

PARA RUBBER.

A shipment of about 1,000 lbs. of Para Rubber prepared by W. A. D. Allport Esq. was forwarded by the Peasants Information Bureau to Gillespie Bros. & Co., London, for sale and a request was made for a report as to quality etc. This follows below.

In handing us their report our Brokers, Messrs. Lewis & Peat, write as follows :—

"Generally the Rubber is quite good for West Indian production and we can only suggest that, if possible, the Rubber can be made in regular size sheets and thickness and also that the sheets be ribbed instead of being smooth. This of course would need a ribbing machine. The Virgin and scrap should be kept quite separate from the sheets and, we think, that slight smoking would be preferred to the unsmoked by our buyers. The small particles of bark must be eliminated. If this is done, the Rubber should be valued within a penny or so for the best Eastern Estates Standard qualities."

This rubber was obtained from trees on Estates in the interior where suitable land for its cultivation abounds, and it is pertinent to mention that samples forwarded for examination to the Imperial Institute in 1909 were remarked on as follows :—

"This rubber is of very good quality and compares favourably in composition with plantation Para rubber from Ceylon, and the Federated Malay States. There is no doubt that the Para tree will furnish excellent rubber in Dominica."

The Department has a fair number of seed bearing trees, awaiting the time when, as it confidently expects, the excellent possibilities of Rubber growing in Dominica will be recognized and taken advantage of.

F. G. HARCOURT,
Agric. Supt.

AGRICULTURAL EXPORTS.

CHIEF EXPORTS.

TABLE OF AGRICULTURAL EXPORTS FOR THE TRIENNIAL PERIOD
1924 TO 1926.

	1924.	1925.	1926.
<i>Lime Products :</i>			
Concentrated Juice ..	237,369 galls.	111,937 galls.	104,014 galls.
Raw Juice ..	348,324 ..	313,896 ..	268,760 ..
Lime Juice Cordial ..	21,944 ..	1,741 ..	2,275 ..
Distilled Oil ...	37,244 lbs.	35,818 lbs.	33,471 lbs.
Ecuelled Oil of Limes ..	11,795 ..	10,531 ..	9,381 ..
Citrate of Lime ...	7,789 ..	—	—
Green Limes ..	19,231 brls.	20,218 brls.	21,171 brls.
Pickled Limes ..	293 ..	536 ..	287 ..
<i>Cocoa Products :</i>			
Cocoa ...	782,281 lbs.	785,669 lbs.	727,034 brls.
Prepared cocoa ...	1,052 ..	226 ..	1,149 ..
<i>Coconut Products :</i>			
Coconuts ...	154,049	225,031	187,791
Copra ...	46,173 lbs.	64,977 lbs.	109,037 lbs. →
<i>Coffee Products :</i>			
Coffee ...	748 lbs.	18,279 lbs.	2,446 lbs.
<i>Sugar Products :</i>			
Rum ...	145 galls.	—	26 galls.
Syrup ...	112 ..	16 galls.	100 ..
<i>Spices :</i>			
Vanilla ...	2,168 lbs.	2,112 lbs.	2,537 lbs.
Nutmeg ...	2,938 ..	1,605 ..	1,543 ..
Ginger ...	1,000 ..	2,100 ..	22,914 .. →
<i>Honey Products :</i>			
Honey ...	4,738 lbs.	7,253 lbs.	5,005 lbs.
Bees Wax ...	45 ..	460 ..	30 ..
<i>Various Products :</i>			
Bananas ...	8,390 bunches	13,834 bunches	10,034 bunches
Oranges ...	1,433 brls.	1,446 brls.	693 brls.
Mangoes ...	7,968 crates	7,925 crates	6,456 crates
Grapefruit ...	327 ..	679 ..	410 ..
Pears ...	1,351 ..	1,326 ..	1,720 ..
Miscellaneous Fruits ..	£48 worth	88 ..	£8 worth
Bay Oil ...	7,406 lbs.	14,283 lbs.	10,745 lbs.
Orange Oil ..	1,319 ..	2,278 ..	805 ..
Kola Nuts ...	£5 worth	—	£8 worth
Cassia Fistula ...	582 lbs.	—	£1 ..
Tamarinds ...	117 brls.	192 brls.	58 brls.
Vegetables ...	£87 worth	£166 worth	£69 worth
Farine ...	3,060 lbs.	—	—
Hides & Skines ...	847 ..	893 lbs.	£74 worth
Leather unmanufactured.	547 ..	1,053 ..	1,299 lbs.
Plants, bulbs & seeds ...	£18 worth	£6 worth	£2 worth
Fruits, Jams & Jellies ...	210 lbs.	160 lbs.	£337 ..
Turtle Shells ...	413 ..	423 ..	271 lbs.
Baskets ...	£28 worth	£12 worth	£1 worth
<i>Forests Products :</i>			
Hardwood ...	100,357 feet	80,287 feet	36,678 feet
Firewood ...	631 cords	1,145 cords	605 cords
Canoe Shells ...	27	75	119
Hoops ...	50 bundles	—	—
Shingles ...	41,125 ..	13,600 bundles	13,000 bundles
Charcoal ...	16,734 lbs.	21,290 lbs.	15,090 lbs.
Locally made Boats ...	26	—	20
Total Values ...	£171,257	£125,596	£143,430

SUMMARY OF LEGISLATION AFFECTING CROPS.

The first step in the direction of plant protection was taken in 1838 when Act No. 3 was passed to provide against the importation of articles likely to introduce diseases among plants. Under the authority of this act, a Proclamation dated August 27, 1898, prohibited the importation from Ceylon of plants, seeds, berries, earth and soil. This Act was suspended by Law No. 9 of 1904, in which provision is made for the fumigation and disinfection of imported plants, cuttings, buds, grafts, bulbs, roots and seeds, and their packages; also their fruit and vegetables intended for propagation, and not for consumption as food.

Under Law No. 6 of 1907 power is conferred to prohibit by proclamation the importation of plants, cuttings, bulbs, roots, seeds, or berries, or any earth or soil, or any article packed therein, or any packages, or other articles or things likely to be the means of introducing any plant disease.

A Proclamation dated February 5, 1909, under No. 6 of 1907, prohibits the importation into Dominica of all plants from Dutch Guiana, which are likely to be a means of introducing disease from that country.

A Proclamation dated October 26, 1910, prohibits the importation of banana plants and suckers from all countries of Central or South America, and from the island of Trinidad, also of coconuts in husk, and all growing plants of coconuts, from Cuba, Jamaica, Trinidad, and all countries of Central and South America.

A Proclamation dated October 9, 1916, restricts under certain conditions, the entry of rooted plants of all kinds from the United States of America, Cuba, Jamaica, Haiti, San Domingo, and Porto Rico.

A Proclamation dated October 26, 1917, prohibits the importation of seed cotton or cotton seed from all countries or places outside the Colony of the Leeward Islands, save and except from some other Presidency of the Colony, or from the Colony of Trinidad and Tobago, and its dependencies or from the Colonies of Grenada, St. Vincent, and St. Lucia, provided, however, that small quantities of cotton seed for experimental purposes may be imported into the Presidency of Dominica, on the written permission of the Superintendent of Agriculture on such terms and conditions as he may prescribe.

A Proclamation dated December 21, 1920, prohibits the importation of sugar cane from any other country into this Presidency, for the time being.

A Proclamation dated February 21, 1921, prohibits the importation of Johnson Grass from any other country into this Presidency: (*Holcus halepensis*.)

A Proclamation dated January 28, 1923, prohibits the importation of Banana plants, (suckers), from all countries except other Leeward Islands, Grenada, St. Vincent, and Barbados.

A Proclamation dated December 24, 1923, prohibits the importation of coconuts and coconut plants from any other country into this Presidency until further orders.

A Proclamation dated May 4, 1925, prohibits the importation of Banana plants (suckers) into this Presidency from all countries except other Leeward Islands, St. Vincent, and Barbados without the written permission of the Governor.

A Proclamation dated July 27, 1925, prohibits the importation of citrus plants from all countries except Windward and Leeward Islands, Trinidad and Tobago, and Barbados. It is, however, allowed that the Curator or Agricultural Officer shall have the power to import for scientific purposes anything thus prohibited, on his making a report of such importation for the information of the Governor.

An Ordinance, No. 23 of 1925, regulates the examination, curing and exportation of Vanilla and also prohibits certain dealings with the same.

An Ordinance dated September 18, 1925, regulates the examination, curing and exportation of Tobacco.

With regard to the export of plants, it is only necessary to state that such cannot be admitted into the United States of America unless accompanied by a certificate showing that they have been inspected by a duly authorized official, and are found free from injurious plant diseases or insect pests.

Ordinance No. 3 of 1926 regulates the Examination and Exportation of fruit likewise Prohibiting the shipment of defective fruit.

METEOROLOGICAL RETURN.

RAINFALL RETURNS, DOMINICA, 1926.

Stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	TOTALS.
1. Bagatelle, Soufrière	3.18	2.75	1.47	4.05	5.80	5.23	7.58	8.38	4.78	7.97	7.77	6.46	65.12
2. Batale	2.35	.83	.50	.47	1.23	3.67	7.86	13.73	3.77	3.80	5.12	1.71	41.44
3. Bellevue	9.54	6.57	4.27	8.93	14.15	12.89	15.72	17.46	11.76	16.58	15.69	12.25	145.81
4. Blenheim	5.17	2.87	1.14	4.81	4.34	8.69	7.71	18.18	6.02	14.82	26.25	33.04	133.04
5. Botanic Gardens	3.68	2.46	.96	2.77	2.24	5.76	10.14	19.10	4.12	5.86	7.54	3.75	57.33
6. Canefield	4.19	3.07	.96	2.81	2.38	6.19	10.87	12.49	4.84	6.47	7.53	2.24	64.09
7. Castle Bruce	7.50	4.07	1.44	12.21	11.69	14.84	21.49	27.73	23.67	39.78	44.06	20.58	237.05
8. Clark Hall	7.08	3.65	1.32	3.21	3.80	7.08	7.82	16.38	5.72	8.89	10.63	5.97	81.60
9. Everton	5.66	5.09	1.70	5.42	7.50	8.45	16.45	19.84	7.50	10.43	9.77	4.92	102.42
10. Fontaine	6.94	5.37	5.24	6.83	12.98	11.51	13.86	13.18	9.77	12.71	11.67	12.47	122.53
11. Goodwill	5.17	2.80	1.22	3.51	2.88	6.57	11.37	10.89	4.83	6.43	8.83	2.95	63.35
12. Governor	6.49	3.92	2.24	5.58	5.19	12.40	10.60	19.36	6.42	21.77	20.77	8.57	123.31
13. Hampstead	3.65	2.20	1.35	3.37	4.77	6.30	7.44	13.32	3.49	14.69	14.03	5.80	80.41
14. Hillsborough	4.95	3.01	.50	3.65	2.48	5.34	9.40	15.09	4.96	6.53	8.84	4.33	69.16
15. Londonderry	—	—	1.55	2.46	4.13	5.56	11.67	14.62	3.44	16.55	15.71	6.69	81.48
16. Moore Park	5.10	3.37	1.34	4.09	4.81	6.85	6.79	12.52	3.86	14.27	15.91	7.74	86.65
17. Morne Bruce	5.00	2.71	1.01	3.23	3.17	6.38	12.91	12.74	5.17	6.78	10.18	3.24	72.52
18. Picard	6.52	3.18	1.49	2.30	1.67	5.25	8.27	15.97	2.56	7.70	9.47	9.09	73.47
19. Pte. Mulâtre	3.61	2.87	3.42	4.98	7.97	9.20	8.73	12.00	6.49	14.64	13.33	7.34	94.33
20. Rosalie	5.41	3.08	1.77	5.13	8.25	11.73	9.20	18.76	6.70	17.67	28.41	8.58	124.69
21. Shawford	11.50	7.00	3.00	8.05	7.25	15.88	32.67	38.82	26.02	32.01	48.30	29.80	239.40
22. Sherwood	11.48	9.13	4.83	6.30	7.37	18.40	16.60	24.95	10.26	15.95	18.79	12.02	156.14
23. Soufrière	5.20	3.07	1.96	4.51	7.62	7.78	10.10	11.62	4.25	9.56	9.59	8.23	83.49
24. St. Aroment	4.77	3.78	1.20	3.61	3.71	6.85	6.76	12.30	4.81	7.97	9.35	4.47	69.58
25. Stowe	4.68	3.35	3.06	3.24	8.87	8.89	9.77	10.80	7.83	16.57	14.93	6.87	93.88
Mean Rainfall	25 Stations	...	...	...	...	...	...	...	103.67	...	...	...	...
"	"	"	"	"	"	11 Leeward Stations...	...	...	71.54	...	...	...	...
"	"	"	"	"	"	4 Windwards...	...	...	95.77	...	...	...	...
"	"	"	"	"	"	5 Inland	...	...	154.30	...	...	...	...
"	"	"	"	"	"	5 Lascye	...	...	130.06	...	...	...	...

METEOROLOGICAL RETURN.

METEOROLOGICAL REGISTER KEPT AT BOTANIC GARDENS, DOMINICA.

1926. Months.	THERMOMETERS.				Relative Humidity.		Thermometer.		Barometer Corrected <i>Reduced to 30° F h and Sea Level.</i>		Rainfall.	Barometer Corrected.		THERMOMETERS.		REMARKS.
	Dry.		Wet.		9 a.m.	3 p.m.	Max'm.	Min'm.	9 a.m.	3 p.m.		Highest	Lowest	Highest.	Lowest	
	9 a.m.	3 p.m.	9 a.m.	3 a.m.													Max	Min.
January ...	77.5	79.7	71.8	71.3	73.	62.8	86.5	68.7	30.04	29.95	3.68	30.08	29.88	90	60	
February...	77.1	80.7	70.9	70.9	70.5	57.	87.1	68.3	30.04	29.94	2.46	30.10	29.88	91	66	
March ...	79.3	81.6	71.3	71.7	64.1	57.4	90.1	68.8	30.03	29.95	.96	30.13	29.85	94.5	65	
April ...	80.	82.2	72.	72.	74.1	56.8	89.8	69.8	30.05	29.98	2.77	30.13	29.94	94	67	
May ...	83.4	85.4	74.5	73.7	61.2	52	92.7	73.1	29.98	29.91	2.24	30.03	29.81	96	69	Weather very hot and hazy from 3rd to 14th.
June ...	82.2	84.3	74.7	74.5	69.9	56.7	91.4	72.5	30.00	29.96	5.76	30.05	29.93	94.5	69	
July ...	83.1	85.3	75.6	76.	66.	65.7	91.8	73.4	29.98	29.94	10.14	30.06	29.77	95	70	Severe storm on night of 22nd.
August ...	82.3	85.3	76.	76.1	71.	61.4	91.4	73.2	29.99	29.94	10.10	30.07	29.87	95.5	71	
September.	84.	85.7	77.	76.9	69.	65.	92.3	75.1	29.92	29.86	4.12	30.00	29.78	94	72	Thunder storms during day of 15th.
October ...	83.	83.6	75.7	75.1	66.6	63.2	90.7	73.5	29.91	29.84	5.86	29.97	29.76	95	69	Thunder storm from 3rd to 4th.
November.	81.5	81.6	75.3	75.	71.2	71.7	88.2	72.1	29.90	29.84	7.54	30.00	29.75	93	70	
December..	77.4	80.9	71.9	72.1	73.7	61.0	86.7	69.1	29.93	29.85	3.75	30.05	29.80	89	67	
											59.38					

Highest Maximum Temperature = 96° on May 10 & 13. Lowest Minimum Temperature = 60° on January 11.

Highest Barometer (Corrected) = 30.13 on April 8.

Lowest Barometer (Corrected) = 29.75 on November 17.

Greatest Rainfall in 24 hours = 5.40 inches on July 22.

METEOROLOGICAL RETURN.

RAINFALL AT THE BOTANIC STATION, DOMINICA, 1906-1927.

Month.	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927.	Monthly Mean Rainfall.
January ...	3.74	4.48	1.56	2.30	5.20	11.46	8.21	7.48	3.22	1.76	10.79	5.00	6.02	2.42	7.54	6.82	6.50	3.82	6.25	7.88	3.68	5.50	5.53
February ..	2.04	3.82	1.16	5.02	11.42	4.00	1.32	2.32	5.56	1.04	1.90	4.10	8.73	1.52	4.76	1.02	4.30	2.30	1.90	1.95	2.46	4.50	3.51
March ...	0.90	1.96	3.68	2.08	1.16	3.11	4.60	7.29	2.23	0.84	4.52	6.74	3.32	0.69	3.80	1.46	2.80	3.46	0.66	3.50	.96	5.37	3.54
April ...	3.18	2.66	3.08	8.12	2.86	5.00	3.38	1.57	6.15	15.75	1.22	0.47	1.86	2.36	.22	3.06	2.26	3.77	1.46	.40	2.77	3.71	3.41
May ...	3.78	1.61	2.24	1.92	7.30	11.16	1.56	3.46	2.58	3.65	2.05	2.94	5.90	4.60	2.38	1.54	2.64	0.13	3.18	2.76	2.44	5.69	3.43
June ...	9.46	5.54	6.16	9.00	14.26	6.54	5.44	3.49	7.27	9.17	4.82	15.34	6.04	3.88	3.48	1.96	7.14	4.18	4.42	5.80	5.76	15.03	7.10
July ...	10.10	8.00	9.22	9.86	12.60	8.08	5.83	7.57	11.83	14.84	8.23	13.70	11.28	12.64	12.08	11.18	6.08	8.20	13.64	6.23	10.14	9.61	9.95
August ...	7.30	7.40	9.41	13.12	10.22	11.43	4.88	10.93	3.98	14.74	16.58	8.53	8.46	9.64	8.76	9.30	9.26	11.44	11.28	13.88	10.10	4.66	9.78
September..	10.88	11.60	7.52	6.44	8.90	15.34	3.32	8.39	7.71	11.36	6.20	15.02	4.14	7.06	8.60	6.28	10.68	4.28	4.88	9.12	4.12	6.20	8.93
October ...	8.12	7.80	5.12	13.10	3.82	7.06	7.26	10.40	5.13	8.41	10.06	2.46	6.67	7.50	12.60	9.41	2.68	9.84	10.98	12.55	5.86	8.21	7.95
November.	9.58	5.98	1.96	4.36	5.40	6.91	11.20	4.28	9.44	10.05	14.28	1.92	3.36	9.02	4.62	2.44	3.00	1.06	6.86	9.60	7.51	8.70	6.43
December .	2.94	8.42	7.80	5.82	7.50	7.14	6.66	2.72	9.70	8.40	3.77	4.58	5.86	6.70	5.62	4.22	6.90	1.92	13.65	2.02	3.75	1.37	6.29
Total ...	72.02	69.30	58.91	81.44	90.64	97.26	63.72	69.90	75.10	100.01	83.42	80.80	71.46	68.03	74.46	61.72	64.24	54.40	79.16	75.69	59.58	78.58	75.88

APPENDIX I.

ADDRESS DELIVERED TO THE AGRICULTURAL & COMMERCIAL SOCIETY,
DOMINICA.BY F. G. HARCOURT, *Agricultural Superintendent.*

ON "LIME VARIETIES IN DOMINICA."

Your Excellency, Your Honour, Mr. President, Ladies and Gentlemen:—

I APPRECIATE the opportunity that your Committee has afforded me in inviting me to address you on the progress made by varieties of limes resistant to Withertip disease, and which for the past two or three years have been under trial by the local Agricultural Department.

In the first place I would point out that if at any time during the progress of these experiments, the Department had sound reason to suppose that a variety of Lime had been discovered and which possessed similar properties to that of our West Indian Lime together with immunity to Withertip disease, no time would have been lost in making this achievement known; therefore my remarks although as frank as possible are necessarily given with a degree of caution, in order that no unsound deductions may be arrived at by you from this report. Before I give a description of the varieties under trial I wish to summarise briefly the objectives of our search.

The desirable properties of our West Indian Lime are well known to you, as also the coastal areas where it may still be economically grown. It is however for estates where Withertip is virulent and always likely to be so, that efforts are being made to find an immune lime, whose yield of juice, acidity, flavour and quality of oil approximates the West Indian Lime. Other essential, or desirable points are prolificness in bearing, quickness and habit of growth, size and shape of fruit, shedding of fruit, method of propagation etc., all of which have to be borne in mind during the course of investigation. The requirements of the Lime Trade have to be met, for it is a case of supporting an established yet crippled industry and not the creation of a new industry, to which our endeavours are directed.

At the time of the outbreak of Withertip there were two varieties of lime, other than the West Indian, under observation by the Department. These were Citrus Hystrix and the Rangpur Lime, the latter being represented by one plant raised from seed presented by the Department of Agriculture, Montserrat.

Although Withertip was first notified in May 1922 some delay (probably to some extent due to awaiting reports of the Mycologists who came to this Island to investigate possible measures of control) was occasioned before the first bud wood of other varieties arrived. In June 1923, budwood and plants were received from the United States Department of Agriculture being followed by another small consignment during the following month. Altogether to date 20 importations have been made from the following sources:—United States Department of Agriculture, Commissioner of Agriculture for the West Indies, Agricultural Department, Hawaii, and the Agricultural Department, Trinidad.

As soon as the budwood was received it was immediately budded on the sour orange stock and during 1924 a few budded plants were distributed for trial in the wetter districts of the Island where Withertip had put a stop to the cultivation of the West Indian Lime. Our Experiment Plot on Morne Bruce was laid out and planted during that year.

To date 1,700 plants of new varieties have been distributed to 19 estates and an experiment plot similar to the Department's plot on Morne Bruce has been established on Melville Hall Estate to Windward. The main objects of this distribution are as follows:—

1. To enable planters, who rarely have the opportunity of visiting the Department, to have the varieties constantly under observation.
2. A thorough test as to the immunity to Withertip disease.
3. To have propagating material on the spot in the event of a particular variety being selected for extensive cultivation.

I propose taking our introductions variety by variety giving a brief description of each, together with information gleaned from observations on their behaviour in Dominica. Up to the present twenty-one varieties have been imported and kept under observation; of

these, three were found susceptible to Withertip, and two did not appear adaptable to our local conditions and died. Of the sixteen varieties remaining I propose to deal with those which have made sufficient progress to warrant report, and these may be observed growing side by side in our Experiment Plot at Morne Bruce.

THE KUSAI LIME.

The Kusai lime is said to have been developed on the island of Kusai, or Strong's Island, Micronesia, by early Spanish settlers.

In the Department Experiment Plot we have three rows of trees of this variety now growing from material presented by the United States Department of Agriculture. Row No. 1 is planted with seedlings. Row No. 2 planted with four seedlings and two plants on Sour Orange Stock. Row No. 3, Budded on Rough Lemon Stock. The seedlings in Row No. 1 replaced plants of Kusai on the Sour Orange stock which failed to make satisfactory progress and eventually died. This led me to the opinion that the Sour Orange Stock was probably unsuitable for this variety, and it was therefore tried on the Rough Lemon Stock. The result was somewhat remarkable, for in six months this variety had made as much growth as it had made on the Sour Orange Stock in eighteen months, and bore a much healthier appearance. This variety also grows well and fairly true to type from seed, but W. T. Pope of the Hawaiian Experiment Station appears to favour budding. He states in his Bulletin the "Acid Lime Fruit in Hawaii published in 1923" that the "Kusai when reproduced from seed usually sends uproot sprouts which eventually develop into thickets," but he informed me in 1925 that they now grow this variety almost entirely from seed and that they are fairly true to type, so much so that budding and grafting is rarely practised. I might mention that it is there considered to be the finest of four varieties tested by that Station up to 1923.

Personally I do not think that it develops any more root suckers than the West Indian Lime. It has a tendency to fruit heavily, ripens late, and only sheds its over-ripe fruits. Possessing a good habit it breaks well naturally, is a vigorous grower and carries medium size spines. Size of fruit is medium to large, somewhat Tangerine shaped with flattened base and rough skin surface. It has plenty of juice, but the flavour does not coincide with the West Indian. The rind is of medium thickness and oil sacs appear numerous. Seeds are plump but few. The clean green fruit has little aroma, and a Tangerine like smell on scratching the rind. It possesses a yellowish juice and the smell is unlike that of the West Indian Lime. The acid content has been found to vary from 9.43 to 10.90 ozs. per gallon. The expressed oil has a decided difference in aroma to that of the West Indian and a sample of this oil together with sample of juice and fruit are here before you for your inspection.

I have dealt somewhat fully with this variety for the reason that from information gleaned from outside sources, we have for some time been hoping that this would be the variety to meet our requirements. Personally I am disappointed in the Kusai, for although it is immune to Withertip, the green fruits in my opinion are useless for the green lime trade and the juice unsuitable for our Raw juice trade.

RANGPUR LIME.

The Rangpur originated in India. Although an acid fruit it is not considered a true lime. We have six bearing plants of this variety growing in the Experiment Station.

There are also six seedling plants in the trial plot on Morne Bruce, and these are also making vigorous growth and commencing to bear. This variety was obtained from Montserrat and the United States Department of Agriculture. It is a spiny lime and grows rapidly and as far as we have observed is immune to Withertip. Its fruit indicates relationship to the well known Mandarin group of citrus fruits. And they do not drop unless over-ripe and more often than not are persistent on the tree. They become orange red on ripening and a Tangerine like smell is to be observed on scratching the rind. The shape of the fruit is somewhat similar to that of the Kusai, and the rind inclined to be rough, medium in thickness, easily separated from the pulp. The juice is orange yellow in colour and its taste and smell unlike that of the West Indian Lime. Its acid content is not high, working out at 10.9 ozs. per gallon, although 11.8 was obtained on one occasion from a test of green fruit. The aroma of the oil is different to that of the West Indian Lime and the fruit unsuitable for our green lime trade. The juice has a peculiar flavour of its own, and I doubt if this variety will be much use to us except perhaps for breeding purposes.

EUSTIS LIMEQUAT.

This variety, obtained from the United States Department of Agriculture, has not grown very well in the Experiment Plot. It has fruited, but in spite of every attention the trees appear to be slowly dying. Clark Hall Estate seems to have been more fortunate as Mr. Harrison reports that "it has fruited with him and made vigorous growth." I have also seen the variety growing well on Sherwood Estate.

The fruits are very small and the skin smooth and very thin. I tried some fruits on an Ecuelling Pan, but the spikes punctured the skin and released the juice.

No sign of Withertip has been observed on this variety. The juice is of different flavour to the West Indian and when tested for acidity gave 12.00 ozs. per gallon.

This variety however drop its fruit on ripening, and is still useful to the Department for experimental purposes.

WOGLUM'S ROUND SEEDLESS LEMON.

There is a row of trees of this variety in the Experiment Plot and two of these are bearing in a striking manner. The habit of the tree closely resembles that of the lemon, it is spineless, bears well and is apparently immune to Withertip. Fruit are large and more lime than lemon like in appearance although the inside of the fruit has a decided lemon appearance. It appears to be a heavy bearer, the fruit having plenty of juice, and which when tested for acid content gave 10.4 ozs. per gallon. The fruits are of yellow colour when ripe and a lemon smell is noticeable on scratching the skin, which is of medium thickness.

The juice is pale in colour and is unlike the West Indian in flavour and smell and the oil is also decidedly different.

I have brought samples of the fruit, juice and oil for your inspection.

WOGLUM LIME.

This variety is showing more promise than the varieties that I have already described. As in the case of Woglum Lemon the habit of the tree closely resembles that of the lemon, but it differs in producing a more upright growth. The points in favour of this tree are:— It is spineless, bears well and is immune to Withertip, and further it is the only variety under trial we find dropping its fruit with a degree of readiness approaching that of the West Indian Lime.

The fruit is large, of round shape and yellow in colour when ripe. It yields a colourless juice with an aroma quite distinct from that of the West Indian: it has, however, a fair acid content, giving on test 12.0 ozs. per gallon. The aroma of the expressed oil closely resembles that of our own lime.

Specimens are here before you for your inspection.

SOUR LIMES.

The plant possesses a very distinctive habit, sending up three or four upright shoots, which appear susceptible to "die back" disease. Our plants are the same age as the other varieties described, but up to the present have shown no signs of fruiting.

CITRUS HYSTRIX.

This species, of which we have two fruiting plants in the Experiment Station, is very distinct in appearance, being armed with thick woody spines. The plants have developed into strong growing trees, the tallest of which is about 35 feet in height. The fruit is large, being almost twice the size of the ordinary lemon, which fruit it somewhat resembles in shape. The juice is very different in flavour, colour and aroma to that obtained from the West Indian Lime. The acid content is however fairly high, namely 13.66 ozs. per gallon from dropped fruits and 11.83 ozs. per gallon from ripe fruits picked from the tree. Fruits appear to drop only when over-ripe.

This species appears to be of little value to us in Dominica, but may prove useful as a stock for other varieties.

TAHITI LIME.

The Tahiti is supposed to be a sport of the Persian variety of Lime and is reported to grow into a round topped tree twelve to fifteen feet high. In the Experiment Plot it is growing healthily and vigorously and two trees have commenced to fruit. I find that the

young shoots are somewhat brittle and easily damaged by wind, but it is possible that they may grow out of this as they become older. The branches are of pendulous habit and set with small spines. The foliage is dense, the leaves being fairly large with a tendency to curl. The variety carries a good name for prolificness, and bears a well shaped fruit, medium to large in size and one which will probably prove suitable for our Green Lime Trade. An undesirable feature is that the fruit does not drop from the trees when ripe. The fruits are practically seedless and a lime-like smell is to be observed on scratching the rind. The juice is very similar to the West Indian Lime in colour, taste and aroma. The smell of the oil is, however, slightly different to the West Indian, but another test will be made on this point, as the only fruits I had available for this purpose were attacked with scale. The acid content of juice, when tested gave 12.2 ozs. per gallon.

Judging from analytical results, this variety, I suggest, is likely to prove the best substitute for the West Indian Lime. Another point in its favour, is that it is said to be practically immune to Citrus canker, to which disease the West Indian lime is highly susceptible. Samples of fruit, oil and juice, I have brought for inspection.

No sign of Withertip has been observed on this lime.

BEAR'S SEEDLESS.

This variety is an improved type of Tahiti and possesses a reputation for heavy bearing in Hawaii.

Our plants in the Experimental Plot are doing well and have commenced to fruit. The habit of the variety is very similar to Tahiti even to the brittleness of the young shoots. The fruit is also similar, being of good shape, medium size and likely to prove suitable for our Green Lime Trade. It does not drop readily when ripe. The juice is similar in appearance, flavour and smell to that of the West Indian Lime and on testing for the acid content gave 11.8 ozs. per gallon.

The essential oil may be classified with the West Indian Lime as far as aroma is concerned. This variety I also commend to your notice as a possible substitute for the West Indian Lime, and it has so far proved itself immune to Withertip.

CITRUS AURANTIFOLIA.

The first seeds of *Citrus aurantifolia* were obtained from the Trinidad Department of Agriculture at the end of 1924 and from which our plants in the Experiment Plot were raised. The plants have grown well with the Department and also on estates where it is under trial.

This variety is highly resistant to Withertip, and no case of infection has so far been noticed in Dominica. On this point I would quote from a communication received from Professor S. F. Ashby, late of the Imperial College, Trinidad, "This is one of the promising lime varieties from the Philippines. It has shown itself quite resistant to Withertip disease under conditions of natural infection at St. Clair, where all the common lime plants are attacked."

It is rather soon for me to give a definite description of the plant; it, however, has the appearance of developing into a stockier tree than most varieties. The flowers are similar to those of the lemon in appearance and the fruit is also lemon shaped and about the size of our West Indian Lime. It may prove useful for our Green Lime Trade. This variety has a reputation in Trinidad of being a heavy bearer. It commences to bear in the second and third year from planting. The juice is unlike the West Indian in flavour and unsuitable for our raw juice trade, but may prove of value for concentrated. Professor Hardy (Trinidad) has tested the juice and finds the citric acid contents to be 10.2 ozs. per gallon, comparing with 12.5—the average test of Dominica juice. I am not aware if this test was made from green or ripe fruit. Our plants have so far yielded only sufficient fruit to make one test, and this gave the extraordinary result of 12.96 ozs. per gallon of total acid. This variety will be closely watched and further tests made, both of juice and oil, when fruit become available.

OTHER VARIETIES.

An interesting variety recently obtained for trial from Trinidad is the Everglade lime. I am informed that it closely resembles the West Indian Lime, both in its fruit and the habit of the tree. It is not immune to Withertip, but it is reported to fruit heavily under conditions which are destructive to the West Indian Lime.

Other interesting varieties under observation are four plants of a cross between the lemon and the lime presented by the United States Department of Agriculture; also six plants of a variety obtained from Burma by the Imperial College of Tropical Agriculture, Trinidad. These plants, however, have only been recently received. The other varieties under trial have not made sufficient progress to warrant report.

I might mention that 84 crosses were made last year between the West Indian Lime and the new varieties with a view of obtaining a hybrid possessing the desirable qualities of the West Indian Lime together with immunity to Withertip. Unfortunately the high winds of the July storm stripped the young fruits from the trees. One fruit however survived, a cross between the Woglum Lime and the West Indian—and one plant has been raised from the few seeds obtained. This important work will be continued during the next flowering period.

GENERAL REMARKS AND SUMMARY.

Experiments are being conducted with various citrus stocks with a view of determining which kind of stock is best suited to a particular variety. This work together with hybridisation work will necessitate the Department acquiring additional land in order that these trials may be properly carried out. I wish to particularly draw your attention to the fact that there is still a considerable area of land on the Leeward Coast, on which the West Indian Lime can be profitably grown. If these lands were planted up and improved cultural methods employed, I am of decided opinion that our production of lime products would in time vie closely to that of our output in pre-withertip days.

From my report on the varieties, you will have observed that the Tahiti, Bear's Seedless and Woglum's Lime approximate in essential points the West Indian Lime. Tahiti and Bear's in flavour of juice, acidity and aroma of expressed oil, and Woglum's Lime in acidity and aroma of oil. These points I submit to your special notice, and I suggest, Mr. President, that your society should now take a more active interest in these experiments, by appointing a small sub-committee to collaborate with me concerning these results with a view of determining whether any of these varieties approximates the West Indian Lime sufficiently to warrant planting up on an extensive scale. You have in your Society members who have had life-long experience in all branches of the lime industry, and their assistance in this respect would be greatly valued by the Department.

Individually, many planters have shown a continued and active interest, and their visits and discussions on these varieties under trial have been appreciated, and I trust, will continue.

I also wish to thank them for their reports on the progress of the varieties distributed to them for observation as to behaviour in their particular district. In conclusion, I wish to express appreciation for the assistance rendered by the Federal Department of Agriculture in carrying out analytical work connected with these experiments. I have received from Mr. Warneford, Assistant Government Chemist, a tabulated summary of these results, giving fuller analytical information than I have placed before you. This information is available at my office.

F. G. HARCOURT,
Agricultural Superintendent, Dominica.

12th January, 1927.

SUMMARY OF CITRUS TESTS MADE BY
F. H. S. WARNEFORD, M.A., B.Sc., A.I.C., F.C.S.,
ASSISTANT FEDERAL GOVERNMENT CHEMIST.

Classification of alcoholic extracts of rind (oil aroma.)

Class A. West Indian, Woglums Lime, Bearss's Seedless.

Class B. Tahiti.

Class C. Kusai (ripe), Kusai (green), Rangpur.

Class D. Woglums Lemon.

ANALYSIS OF JUICES.

Variety.	Total solids %	Ash %	Total acid as Citric acid %	Ozs. per gallon.	True Citric %	Citric Ozs. per gallon.	Citric acid as % Total acid.	Purity Citric A. Total A.
Kusai (green)	7.77	0.31	6.35	10.2	5.9	9.4	93%	76%
Kusai (ripe)	7.46	0.38	5.9	9.4				
Bearss's Seedless	8.36	0.23	7.4	11.8	7.0	11.2	95%	84%
Woglums lime	8.47	0.28	7.5	12.0	7.21	11.5	96%	85%
Woglums lemon	7.66	0.36	6.7	10.7	6.51	10.4	97%	85%
Tahiti	8.64	0.30	7.6	12.2	7.42	11.9	97%	86%
West Indian	9.18	0.25	8.15	13.0	7.8	12.5	96%	85%
Rangpur	8.33	0.32	7.2	11.5	6.8	10.9	94%	82%

True citric acid (Warington) not determined in the case of the West Indian lime, but assumed to be 96% of total acid.

In the case of Kusai (ripe) the Warington result was not trustworthy and is not included in this table.

APPENDIX II.

SUMMARY OF REPORT OF PEASANTS' INFORMATION BUREAU.

1. The Bureau was opened on the 1st of July, 1926, in premises on the Bay Front in Roseau. These premises are commodious and conveniently situated and have proved eminently satisfactory for the purpose.

2. The initial work of the Peasants Adviser was to get the scope and aims of the Bureau made known as widely as possible. This was attained by (a) advertisement in the local newspapers (b) posters widely distributed throughout the Islands (c) letters to Ministers of Religion and other persons of influence residing in the country districts.

3. These measures were successful, and I am pleased to be able to report that the Bureau has already gained the confidence of a considerable number of peasants, who no longer regard it as a deep-laid scheme for obtaining information for purposes of taxation, or for some other purpose inimical to them. Many agencies have no doubt contributed to this result, but that such a measure of confidence should have been attained in so short a time exceeded my most sanguine expectations.

4. *Scope of Work.* The work of the Bureau consists of:—(a) The dissemination of information as to the fluctuations in the local prices of the principal products of the Island. (b) Receiving produce for shipment or local sale, making advances where necessary, and subsequently finding markets for same. (c) Assisting peasants to market their own produce to best advantage. (d) Purchasing produce where no satisfactory local demand exists, and marketing such produce abroad. (e) Advising and encouraging peasants in their agricultural efforts and by kindly sympathy stimulating them to "keep on pegging away" at the job.

5. The dissemination of information is secured by the issue of weekly market reports which are posted at all Police Stations, and at all School Houses in the centres where there is no Police Station. These reports are also published in one of the local newspapers which has a very large circulation. From time to time whenever the need arises, special circulars are issued, advising as to any important alteration in the price of any commodity which may have taken place since the date of the last regular circular. I have received the most gratifying assurances of appreciation of these reports from a very large number of persons among the class for whose benefit they are issued.

6. *Produce received for Sale or Shipment*, has included most of the products of the Island. One hundred and sixteen of such transactions took place in the nine months to the end of the financial year and the results of the sales of the produce have in most cases been highly gratifying to the parties interested. The total value of shipments in the period under review has amounted to about £696. 0. 0. and advances have been about £125. 0. 0. This business seems likely to grow considerably, but expansion will probably be rather slow at first, owing to the fact that most of the peasants are to some extent tied financially or otherwise, to their existing local agents.

7. The disposal of produce which is unsaleable in Northern markets has necessitated the securing of suitable Agents in the various West Indian Islands and in Bermuda. This has proved a matter of considerable difficulty. Reliable firms of established reputation can not be induced to receive small consignments of local produce: and the people who will undertake to sell such shipments are not always reliable. The difficulties are, however, being overcome and I hope before long to have satisfactory agents in all the places where local produce can be disposed of.

8. Whenever produce can be sold locally at good prices, such peasants as are able to do so are encouraged to do their own marketing, the assistance of the Bureau being limited to advise as to how much they should receive for the produce, and where the best prices can be obtained. Further reference to the Bureau is invited should any difficulty be met with. In all places where the peasant lives a considerable distance from town, and is unable or unwilling to come in, the Bureau deals with the produce as mentioned in the preceding paragraph.

9. *Purchasing of Produce.* This is only resorted to in cases where there is no other means of dealing with the situation. It became necessary in the early days of the Bureau's existence as the only way of controlling the price of Maize. Fairly large quantities of

Maize are produced at a certain time of the year, and as it all comes in to the market at once, and in a condition in which it is very perishable, there is a glut and prices fall to a level at which they are unremunerative to the grower. This situation arose last year, and the Bureau was able, without loss, to stabilise the price at a figure which left a profit for the producer. About Christmas time farine was sent in to the Roseau market in such large quantities that it became almost unsaleable. The Bureau purchased at a fair price all that was offering, and was subsequently able to market it at a small profit. Quite recently a similar situation arose with regard to arrowroot and Tous les mois. The market was controlled by the Bureau purchasing practically the entire crop at prices considerably above the then existing market price. The greater part of the arrowroot purchased has been shipped to London and further shipments will be made. If the profit realised on this transaction should prove to be as substantial as I hope it will be, I shall strongly recommend that a bonus be paid to the producers in order to stimulate increased production, the industry being one which is highly desirable to foster. Arrowroot and Tous les mois are produced in only one section of the Windward Coast, a district in which there are few outlets for the peasant's energies.

10. The fact that the production of these starches has survived through years of low prices proves that the soil and other conditions are well adapted to it. For arrowroot there is a large market in London. Tous-les-mois on the other hand is not readily saleable abroad, and I am endeavouring to create a demand for it among the makers of invalid foods. Its great value lies in its extreme digestibility as compared with other edible starches.

11. The disposal of produce for which no market exists abroad has presented some difficulty. The Bureau not being suitably placed for the disposal of small lots of stuff, by retail, a stall was established in the market. While this has proved to be of considerable assistance at times, I cannot claim that it is yet an unqualified success, the overhead charge being out of proportion to the turn-over.

12. *Fruit Shipments.* A considerable number of shipments of fruit have been made to various markets. These have not all proved successful. Some shipments have brought very satisfactory returns, others have resulted in debit notes. This is usual in the fruit trade which is a highly speculative one; but while the general trader is able to set his gains against losses, the Bureau has to part with all the profits of the successful shipments to the parties for whom the fruit was shipped and to bear all the losses of the people who are too poor to pay up. Great caution is therefore necessary, and is being exercised in the development of this branch of the Bureau's business. A recent small shipment of grapefruit has however been most encouraging. Four crates of fruit only were sent. They were shipped by a cargo steamer which called at three ports after leaving Dominica and was about twenty days on the voyage; nevertheless the fruit arrived in good condition, and Messrs. George Munro & Co., of Covent Garden, while commenting adversely on both grading and packing, were able to present a very satisfactory account sale, the fruit having realised from 30/- to 40/- per standard crate. The Barbados market has proved highly unsatisfactory, for, while there is no difficulty in getting the fruit there in good condition, the prices realised even for the choicest fruit has hardly been sufficient to pay packing and transportation charges. Bermuda is at present the safest market for fruit, and as soon as arrangements have been perfected for disposal of the fruit there, a good deal of business can be developed.

J. C. MACINTYRE,

Peasants Adviser.

“ TROPICAL AGRICULTURE ”

THE JOURNAL OF THE
IMPERIAL COLLEGE OF
TROPICAL AGRICULTURE

PUBLISHED MONTHLY AT TRINIDAD,

BRITISH WEST INDIES.

“Likely to prove of value and interest to producers in many tropical parts of the Empire.”—EMPIRE PRODUCTION AND EXPORT. “The general arrangements and contents of the Journal are distinctly good.”—NATURE. “The Journal is welcomed amongst agricultural literature and the various articles in its first number are worthy of close study.”—THE TROPICAL AGRICULTURIST (Ceylon.)

SUBSCRIPTION RATES: 6d. per copy, 6s. per annum; post free within the British Empire. Foreign postage 1d. per copy, 1s. per annum.

Orders (with payment in advance) should be sent to the Editor, “Tropical Agriculture,” Imperial College of Tropical Agriculture, St. Augustine, Trinidad, British West Indies.